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ABSTRACT

This document describes one of the second-year courses meeting the two-year mathematics high school requirement satisfying the New York Regents Action Plan. This handbook is designed to meet the needs of teachers who will be teaching the Consumer Mathematics course. The handbook, for use with staff development programs, has five main sections: (1) program scope and sequence; (2) overview of consumer mathematics course; (3) specific activities for consumers mathematics; (4) classroom management for consumer mathematics; and (5) computer applications in consumer mathematics. These sections include background information, lesson descriptions, homework assignments, worksheets, and tests. (PK)

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Consumer Mathematics

Volume One

Staff Development Program 1986-1987

SE 048 796

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FOREWORD

The Division of Curriculum and Instruction welcomes you to our 1986-87 Staff Development Program. As there are two possible formats for this year's program, the Program, Scope and Sequence have been designed so that they can be easily adapted to accommodate either of the 12-hour programs. This handbook for Consumer Mathematics meets the needs of teachers who will be teaching the course this fall. Each unit is planned for a four-hour session. The same unit can be used for two two-hour workshops. It is our hope that the ideas generated in these sessions will be used in the classroom to stimulate learning.

Consumer Mathematics is one of the possible second-year courses meeting the two-year mathematics requirement satisfying the Regents Action Plan.

There will be follow-up workshops next semester to continue the process of implementing Consumer Mathematics stressing additional areas of instruction and subject-matter content. Your evaluation and suggestions will be included in the next group of workshops. Some of the areas to be developed in the follow-up program will include questioning techniques, student activities, improving student study skills and mathematical games to promote retention of the mathematical concepts and procedures developed in the Consumer Mathematics classes. It is hoped this course of study will lead to more students electing fourth and fifth year mathematics courses.

The use of the computer component is found in Consumer Mathematics Volume II is to be implemented in all schools with computer rooms. The merging of computer lessons with the various units have been indicated in the curriculum guides.

We wish to thank all those who have participated in developing materials for the various workshops. We hope that through our combined efforts in sharing new ideas and skills, mathematics education in New York City will continue to provide challenging and supportive instruction for all our students.

Charlotte Frank

Charlotte Frank
Executive Director
Division of Curriculum and Instruction

ACKNOWLEDGEMENTS

The 1986-87 Staff Development Program for Consumer Mathematics was developed as a project of the Mathematics Unit of the Division of Curriculum and Instruction, Charlotte Frank, Executive Director.

Morris Freedman, Director of the Office of Curriculum Development and Support, provided overall supervision of the project.

The project was initiated under the supervision of Lorraine Largmann, Director of Mathematics. Maria DeSalvio, Assistant Director of Mathematics, gave impetus and guidance to this project by supervising the following planning, writing and editing teams.

The Consumer Mathematics Program was cooperatively planned by the following:

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The cover design was executed by Kent Beaty

CONSUMER MATHEMATICS

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PROGRAM

SCOPE AND SEQUENCE

STAFF DEVELOPMENT PROGRAM FOR CONSUMER MATHEMATICS

SCOPE AND SEQUENCE

OVERVIEW OF NEW CONSUMER MATHEMATICS COURSE

	Performance Objectives: Participants will be able to....
Fulfillment of the Regents Action Plan	Describe the two-year mathematics requirement of the Regents Action Plan.
	Identify possible second-year course offerings to meet the two-year requirement.
	Explain how Consumer Mathematics satisfies the Regents Action Plan.
Scope and content of Curriculum Guide	State the number of units that need to be covered.
	Identify which units must necessarily be covered.
	Identify which units teachers can select to complete the course requirement.
Uniform Examinations	Identify the required units necessary for a city-wide exam.
	Describe the format of the city wide exam.
Using Calculators and Computers in the Curriculum	Explain how calculators can be incorporated into the course.
	Utilize Volume II - Computer Applications in designing lessons for Consumer Mathematics lessons.
	Merge computer lessons with various units in Volume I.
	Use an electronic spreadsheet, such as Visicalc.

SPECIFIC ACTIVITIES FOR TEACHING CONSUMER MATHEMATICS

	Performance Objectives Participants will be able to...
Model lesson	Identify elements of a model lesson in Consumer Mathematics that communicates positive attitudes to students.
	Critique the model lesson by using a prepared ckeck test.
	Analyze aspects of a good Consumer Mathematics lesson.
Lesson Planning	Develop a Consumer Mathematics lesson, adapting the lessons from curriculum guide.
	Prepare alternative motivation for Consumer Mathematics lessons.
	Relate lessons in Consumer Mathematics to real-life situations.
Use of Prepared Materials	Use the overhead projector as a tool in Consumer Mathematics lessons.
	Prepare overhead transparencies and duplicated sheets for Consumer Mathematics lessons.
	Use commercially prepared material in Consumer Mathematics lessons.
Computer Applications.	Incorporate computer activities in Consumer Mathematics lessons.

CLASSROOM MANAGEMENT IN CONSUMER MATHEMATICS

	Performance Objectives Participants will be able...
Reading and Writing Skills	Identify opportunities for the inclusion of reading and writing activities in Consumer Mathematics lessons.
	Design reading and writing activities for inclusion in Consumer Mathematics lessons.
The Daily Homework Assignment	Identify elements of a good homework assignment.
	Analyze prepared Consumer Mathematics homework assignment.
	Prepare model homework assignments.
Testing	Identify elements of a good test.
	Analyze a sample Consumer Mathematics examination.
	Prepare a model Consumer Mathematics examination.
Problem Situations	Identify problem situations that may arise in a Consumer Mathematics class.
	State possible solutions to given problems classroom situations.
Basic Skills	Reinforce the basic skills necessary for Consumer Mathematics and more advance mathematics
	Make provisions in Consumer Mathematics lessons for students who yet passed the Regent Compentensy test.
Providing for Individual Differences	Prepare appropriate materials for more capable students in Consumer Mathematics classes.
	Prepare appropriate materials for less capable students in Consumer Mathematics classes.
	Prepare appropriate materials for the excessiveley absent student.

COMPUTER APPLICATIONS IN CONSUMER MATHEMATICS

	Performance Objectives Participants will be able to...
Introduction to the Electronic Spreadsheet	Identify appropriate circumstances for the use of a spreadsheet.
	Use Visicalc to design a spreadsheet.
	Illustrate the use of a spreadsheet in a Consumer Mathematics lesson.
The Computer Lab	Use the computer lab to teach Consumer Mathematics.
	Identify differences between teaching in a regular classroom and teaching in the computer lab.
The Computer Lesson	Adapt lessons in Consumer Mathematics Volume II to appropriate lessons in Volume I.
	Provide for individual differences of students by using the computer in the teaching of Consumer Mathematics.

OVERVIEW OF THE

CONSUMER MATHEMATICS

COURSE

REGENTS ACTION PLAN
MATHEMATICS - TWO-YEAR REQUIREMENT

LOCAL DIPLOMA

FIRST YEAR	COMPETENCY REQUIREMENTS	SECOND YEAR
Fundamentals of Mathematics	RCT	Course I (non-Regents) Course I (Regents) Business Mathematics Consumer Mathematics Computer Mathematics Occupationally-Related Mathematics
Business Mathematics	Regents Examination	Course I (non-Regents) Course I (Regents) Computer Mathematics
Course I (non-Regents)	RCT	Course I (Regents) Course II (non-Regents) Business Mathematics Consumer Mathematics Computer Mathematics Occupationally-Related Mathematics
Course I (Regents)	Regents Examination	Course II (non-Regents) Course II (Regents) Computer Mathematics Occupationally-Related Mathematics

REGENTS DIPLOMA

FIRST YEAR	COMPETENCY REQUIREMENTS	SECOND YEAR	
Course I (Regents)	Regents Examination	Course II (Regents)	Regents Examination

Summary of Mathematics Requirements
In the New Part 100
of the Commissioner's Regulations

A. Requirements for Grades Pre-K-6

1. In pre-kindergarten and kindergarten, learning activities shall include mathematical experiences.

2. During grades one through six, students shall receive instruction in arithmetic.

3. Students shall take pupil evaluation program (PEP) tests in mathematics in the third and sixth grades.

   a. Students who score below the designated State reference point on the PEP test shall be provided appropriate remedial instruction designed to enable them to succeed on their next pupil evaluation program test, either the grade 6 PEP test or the Regents competency test in mathematics.

      (1) Remedial instruction means instruction using materials and techniques specifically designed to meet the individual instructional needs of those students scoring below a State reference point. In public schools such instruction shall be provided by a certified teacher qualified to provide remedial instruction, as determined by the superintendent.

   b. The parent or guardian of a student who is to be provided remedial instruction shall be notified in writing, by the principal, of the PEP test results and the plan for remedial instruction, which shall begin no later than the commencement of the school semester after which the test is given.

B. Requirements for Grades 7-8

1. Students completing grade 8 shall have completed two units of study in mathematics. A unit of study means at least 180 minutes of instruction per week throughout the school year, or the equivalent.

2. Beginning in September 1986 students in grade 8 shall have the opportunity to take high school courses in at least five subject areas, one of which may be mathematics. The mathematics course must be a Regents course with high school credit to be awarded only if the student passes both the course and its Regents examination.

C. Requirements for Grades 9-12

1. Unit of Credit Requirements

   a. Students of the graduating classes of 1986 and 1987 shall earn one unit of credit in mathematics for either a local or a Regents diploma and must pass either the Regents competency test in mathematics or a Regents examination in mathematics or business mathematics.

(1) A unit of credit is earned by:

(a) the mastery of the learning outcomes set forth in a State developed or locally developed syllabus, after a student has had the opportunity to complete a unit of study in the subject or

(b) a passing score of at least 85% or its equivalent on a Department approved examination in the subject without completion of a unit of study, and the successful completion of either an oral examination or a special project. This can be done only on the approval of a superintendent or his/her designee.

b. Students graduating in 1988, for either a local or a Regents diploma, shall earn two units of credit in mathematics and must pass either the Regents competency test in mathematics or a Regents examination in mathematics or business mathematics.

c. Students graduating in 1989 and thereafter shall earn two units of credit in mathematics as follows:

(1) For a Regents diploma, units of credit for two Regents mathematics courses (Math 9 and Math 10 or Course I and Course II) with the passing of the Regents examination in each.

(2) For a local diploma, units of credit for two mathematics courses such that the second course shall deepen the understanding or broaden the applications of a student's mathematical concepts beyond the first course. The student must also pass either the Regents competency test in mathematics or a Regents examination in mathematics or business mathematics.

(a) One of the two mathematics units required for a local diploma may be satisfied by an occupational education course, either business mathematics or, for a student pursuing an occupational education sequence, the State developed course for occupationally-related mathematics.

(3) At the end of this Summary is a chart listing the various alternatives for the two units of credit requirement.

2. Sequence Requirements

a. For students graduating in 1986, 1987, and 1988, a Regents sequence in mathematics consists of passing Courses I, II, and III and the Regents examinations in Courses II and III, or passing the courses for Math 9, Math 10, and Math 11 and the Regents examinations in Math 10 and Math 11.

b. For students graduating in 1989 and thereafter, a Regents sequence in mathematics consists of passing the three Regents courses in mathematics and passing the Regents examination in all three. Business mathematics may not be included in this sequence.

c. A five-unit sequence in mathematics consists of the three-year Regents sequence, a fourth year mathematics course at a level beyond the sequence, and an additional unit of advanced mathematics. Only one of the five units may be a computer math course and this must be at an advanced level.

d. A three-year sequence in mathematics for a local diploma consists of one additional unit of credit in mathematics beyond the two units completed to satisfy the minimum local requirement. Only one of the three units may be satisfied by an occupational education mathematics course.

5/85

CONSUMER MATHEMATICS

VOLUME I

Unit: Calculators

Lesson No.	Topic	Page No.
1	Performing Four Basic Operations	1
2	Finding Square Root	5
3	Performing More Complex Operations	8
4	Rounding Off Results of Complex Computations	11
5	Estimating the Results of a Computation Problem	15
6	Balancing a Checkbook	18
7	Using Simple Flowcharts to Predict the Output of a Calculation	23
8	Using Order of Operations	28
9 *	Solving Problems Involving Percent	31
10	Finding Sales Tax	34
11	Finding the Total Price of an Article	38
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1	Computing the Cost of Commuting to Work	46
2 *	Determining the Total Number of Hours Worked	49
3	Converting Annual Salary to Monthly and Semi-Monthly Salary	52
4	Converting Annual Salary to Weekly and Biweekly Salary	55
5	Computing the Hourly Rate for Salaried Employees	58
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* MAY NEED A "PRE-LESSON" ** MAY NEED TWO DAYS

Lesson No.		Topic	Page No.
7		Computing New Yearly Income if Percent Increase is Known	64
8		Computing Tips and Gross Income	66
9		Computing Overtime Earnings at a Hourly Rate	68
10		Computing Gross Earnings Involving Overtime	72
11		Determining Total Earnings for Employees Paid Straight Commission	75
12		Computing Gross Pay for Employees Paid Salary and Commission	77
13	**	Computing Gross Pay for Employees Paid Salary and Graduated Commission	80
14		Determining Earnings Based on Piecework	82
15		Finding the Amount for Federal Income Taxes and Social Security	85
16		Finding the Total Amount of Deductions from Gross Pay	88
17		Computing the Net Pay given the Total Amount of Deductions	91
18		Determining Net Pay Given Specific Amounts for Various Deductions	93
19	**	Using the Consumer Price Index	96
20		Using Classified Ads	99

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1		Budgeting Family Income	103
2		Determining Net Worth	106
3		Reading Labels	108
4		Using Comparison Shopping	110
5		Computing Sales Tax	113
6		Shopping from a Catalog	116
7		Shopping at Sales	119

* MAY NEED A "PRE LESSON ** MAY NEED TWO DAYS

Lesson No.	Topic	Page No.
8	Buying by Installment	121
9	Using Charge Accounts	125
10	Understanding Savings Accounts	129
11	Reading a Checking Account Statement	130
12**	Using a Checking Account	133
13**	Reconciling a Checking Account	136
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16**	Using Interest Formulas	146
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18**	Computing Effective Interest Rates	152
19	Understanding Savings Bonds	154
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1	Purchasing a New Automobile	159
2	Paying for a Used Car	163
3**	Determining Automobile Insurance	167
4	Using the Driver-Rating Factor	172
5	Computing Expenses of Operating and Maintaining an Automobile	177
6**	Computing Expenses Associated with Automobile Leasing	181
7	Computing Costs of Using the Rapid Transit System	185
8	Taking a Taxicab	189
9	Traveling by Air	193
10	Planning a Budget for Vacation Costs	197
11	Belonging to a Health Club	201
12	Planning for Expenses Involved in Recreational Activities	206

* MAY NEED A "PRE-LESSON" ** MAY NEED TWO DAYS

Lesson No.	Topic	Page No.
13	Starting a Hobby	210
14	Using the Golden Rectangle	214
15 **	Buying a Personal Computer	218
16	Recording Basic Basketball Statistics	225
17	Reading a Baseball Box Score	233
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20	Noting the Difference Between Improbable and Impossible	255
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2	Solving Verbal Problems in Planning Meals	263
3	Analyzing Calorie Consumption	266
4	Using Metric Units of Length	270
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7	Solving Verbal Problems Using Perimeter	282
8	Solving Verbal Problems Using Circumference	286
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11	Solving Area Problems Using Circles	299
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13	Solving Verbal Problems Involving Volume	305
14	Determining Power Consumption	307

* MAY NEED A "PRE-LESSON" ** MAY NEED TWO DAYS

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16	Reading Utility Meters	312
17	Reading Utility Bills	315
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20	Determining Insurance Costs for Maintaining a House	323
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12	Cumulative Frequency Histograms; Constructing Cumulative Frequency Histograms	364
13	Reading and Interpreting Line Graphs	369
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* MAY NEED A "PRE LESSON" ** MAY NEED TWO DAYS

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17	Constucting Circle Graphs	384
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4*	Using Similar Triangles to Measure Indirectly	412
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6**	Determining the Tangent Ratio, and Using a Trigonometric Table	419
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8**	Using the Tangent Ratio to Solve Verbal Problems Involving Calculating Lengths Indirectly	429
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* MAY NEED A "PRE-LESSON" ** MAY NEED TWO DAYS

CONSUMER MATHEMATICS COURSE ... TEXT REFERENCES

PART 1

Books: Consumer Mathematics - Houghton Mifflin
Mathematics for Everyday Life - Merrill
Consumer and Career Mathematics - Scott Foresman

Lesson Number	Houghton - Mifflin Pages	Merrill Pages	Scott, Foresman Pages
UNIT I	**CALCULATORS**		
1	5-10	62-64, 410-426	4-22
2	-	-	-
3	-	-	-
4	-	-	-
5	-	52, 57, 56, 53	6-8, 11-13, 16-19
6	90-95	114-117	91-97
7	-	60, 62-63, 67	-
8	-	58, 59	-
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3	32-33, 43	-	-
4	32-33, 43	-	-
5	-	-	-
6	24-25	20-21	68-69
7	-	-	-
8	25	-	70-71
9	20-21	-	-

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14	108-109	-	-
15	110-111	-	100-101
16	-	-	-
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12	-	-	-
13	-	-	-
14	-	-	-
15	-	-	-
16	-	-	-
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19	-	-	-
20	-	-	-
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10	-	272-273	-

SPECIFIC ACTIVITIES

FOR

CONSUMER MATHEMATICS

VIEWING A LESSON

QUESTIONS TO CONSIDER

The purpose of the following questions is to examine the lesson presented for teacher planning, questioning, motivation, performance and attitude.

Note: The word student refers to the "participants" in this class.

_____

_____

	YES	NO
THE LESSON		
1. Was there a clear aim and a definite movement towards its attainment?	—	—
2. Was the aim specific, definite and worthwhile?	—	—
3. Was the aim elicited from the class?	—	—
4. Was the aim in the form of a question?	—	—
5. Was the motivation effective in arousing your interest in the lesson?	—	—
6. Did the lesson follow the syllabus for the subject and term?	—	—
7. Was there sufficient opportunities for student participation?	—	—

	YES	NO
TEACHER PLANNING		
1. Did the teacher show evidence of following a written lesson plan?	—	—
2. Was there evidence that materials (models, activity sheets) had been prepared before the lesson?	—	—
3. Did the teacher utilize the chalkboard in a clear and sequenced manner?	—	—
4. Were rexographed materials or activity sheets a necessary component of this lesson?	—	—
5. Did the teacher use an effective motivation for this lesson?	—	—
6. Was the chalkboard used to summarize the lesson and to guide effective note-taking?	—	—
7. Were model answers placed upon the chalkboard as a visual reinforcement?	—	—
8. Were the students actively involved through physical participation in the lesson (e.g. writing at chalkboard, using manipulatives)?	—	—

	YES	NO
QUESTIONING		
1. Were thought provoking as well as factual questions asked?	—	—
2. Were questions distributed among the entire class?	—	—
3. Was sufficient time alloted between questions and answers?	—	—
4. Did students answer the teacher"s questions during the lesson?	—	—
5. Did students ask questions during the lesson?	—	—
6. Did the teacher"s questions lead to student socialization?	—	—
7. Did the teacher support student discussion rather than lead it?	—	—
8. Were questions interesting enough to sustain your attention?	—	—
9. Were one word answers discouraged by the teacher?	—	—
10. Did the teacher avoid asking questions resulting in a yes or no answer?	—	—
11. Were the students actively involved in forming generalizations, discovering mathematical principles and stating conclusions during the lesson?	—	—

	YES	NO
12. Did the teacher call on non-volunteers as well as volunteers?	—	—
13. Did the teacher foster a climate of critical thinking by the types of questions asked?	—	—

APPLICATION AND DRILL PROBLEMS

1. Were applications graded in difficulty?	—	—
2. Were applications varied?	—	—
3. Were problems reviewed on the board by the students in the class?	—	—
4. Were applications included in the lesson plan?	—	—
5. Were problems and applications related to real-life situations and practical problems?	—	—
6. Were students encouraged to continue the study of the problem by library references, special books or reference to magazine articles?	—	—
7. Were students challenged by changing the conditions of problems?	—	—

	YES	NO

SUMMARY

1. Were medial summaries used during the lesson?	—	—
2. Did the lesson have a final summary?	—	—
3. Was the summary elicited from the students?	—	—
4. Was the aim of the lesson answered in the summary?	—	—
5. Was the class aware of having achieved the aim stated at the beginning of the lesson?	—	—
6 Were the essential elements of the lesson apparent?	—	—
7. Were procedures developed during the lesson elicited and written on the chalkboard?	—	—

	YES	NO
THE ASSIGNMENT		
1. Was the homework clear and specific?	—	—
2. Was the homework motivating?	—	—
3. Was the homework cyclical (examples from previous lessons or examples of pre-requisite skills)?	—	—
5. Did the homework include material from the new lesson?	—	—
6. Did the homework include a reading assignment and the solving of problems?	—	—
7. Was the homework of reasonable length?	—	—
8. Did the homework consist of problems graded in difficulty and varied in form?	—	—
THE TEACHER		
1. Did the teacher have a sense humor?	—	—
2. Was the teacher"s voice clear and well-modulated?	—	—
3. Did the teacher appear interested and enthusiastic in presenting this topic?	—	—
4. Was the teacher familiar with the subject matter?	—	—
5. Did the teacher use class time efficiently?	—	—
6. Was the teacher well-prepared?	—	—

	YES	NO
7. Did the the teacher begin the lesson promptly?	—	—
8. Was the teacher sympathetic to students having difficulty?	—	—
9. Did the teacher encourage students to learn more about this topic?	—	—
10. Did the teacher encourage slower students?	—	—
11. Was student-teacher rapport evident?	—	—
12. Did the teacher avoid sarcasm when incorrect answers or interruptions in the lesson occurred?	—	—
13 Did the teacher avoid lecturing?	—	—
14 Did the teacher show more interest in the procedure of solving a problem rather than in the answer?	—	—
15. Did the teacher encourage students to verbalize their thinking?	—	—
16. Did the teacher create a classroom climate conducive to learning?	—	—
17. Was a developmental approach to learning used by the teacher?	—	—
18. Did the teacher display a positive attitude towards the subject?	—	—
19. Did the teacher's attitude 'turn-on' students in the Consumer Mathematics class?	—	—

	YES	NO
20. Did the teacher have a positive opinion of the students?	—	—
21. Would the teacher's classroom techniques help to prevent discipline problems in a Consumer Mathematics class?	—	—
22. Would the teacher's attitude foster student growth, retention and understanding of mathematics?	—	—

CONSUMER MATHEMATICS

INDIRECT MEASUREMENT AND TRIGONOMETRY

LESSON: 8

AIM: How do we use the tangent ratio in a verbal problem requiring us to calculate lengths indirectly?

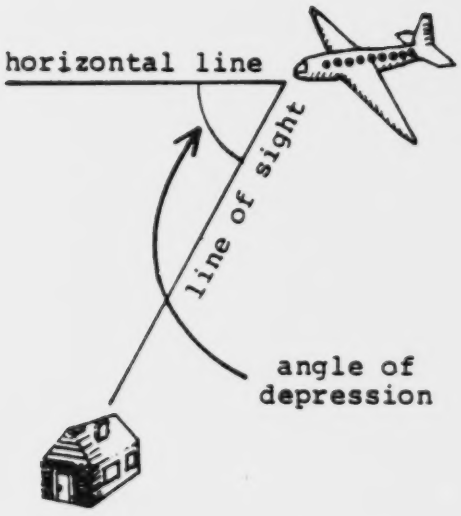
PERFORMANCE OBJECTIVES: The student will be able to...

1. Define the angle of elevation and the angle of depression.
2. Use the tangent ratio in a word problem to find a missing length (rounded).

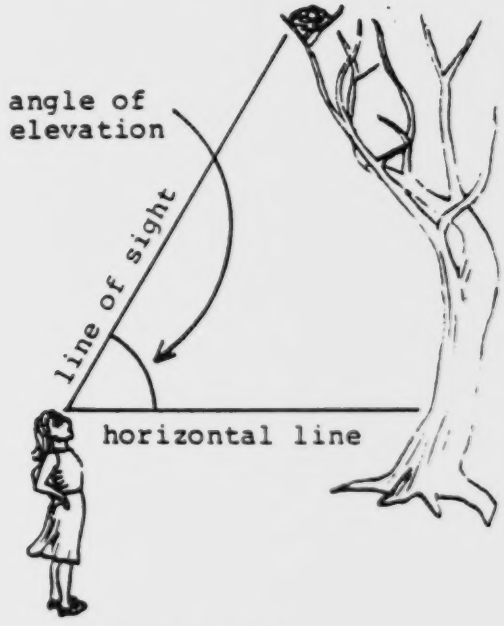
Note: Calculators, if available, are very useful for this lesson.

VOCABULARY: angle of elevation, angle of depression

MOTIVATION:



SITUATION (A)



SITUATION (B)

In order to make indirect measurements we often use ANGLES. TWO common situations are shown in the diagram. In both cases, a person is looking at an object (pilot observing building in (A); a person looking at the top of the tree in (B)). We will focus on the angle formed by the line of sight and the horizontal line coming from the viewer's eyes.

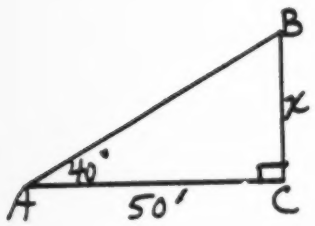
DEVELOPMENT:

1. Write on the board: When an observer must look up to see the object, we call the angle formed, the **ANGLE** of **ELEVATION**. When the observer must look down to see the object, we call the angle formed, the **ANGLE** of **DEPRESSION**.

2. Set up the following problem with your class:

   At a point 50 yards away from the foot of a tree someone measures the angle of elevation of the top of the tree to be 40°. Find, to the nearest foot, the height of the tree.

   Elicit that the diagram for situation (B) will suffice.



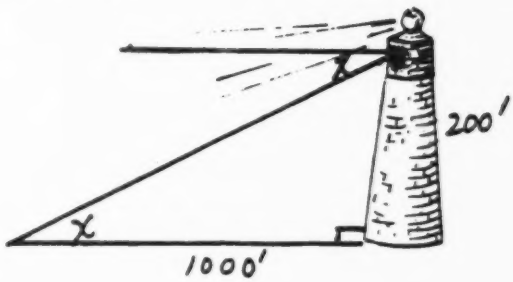
   Ask, "Why is the triangle for this problem a right triangle?"
   Ask, "Why can we use trigonometry to solve this problem?" (Elicit that we have a right triangle involving an angle and its two legs.) Set up: $\tan 40 = \frac{x}{50}$

   $x = 50(.8391) = 41.955$. Thus our answer is: The tree is 42 feet tall. Ask, "Does this answer make sense?"

3. Have your class set up the following problem:

   Find to the nearest degree the measure of the angle of depression from the top of a lighthouse 200 feet tall when a boat is observed 1000 feet away.

   a) Develop the diagram.
   b) Elicit that the angle of depression and the corresponding angle of elevation are congruent.
   c) $\tan x = \frac{200}{1000} = .2$



   Using the trig table, $m\measuredangle x = 11$.

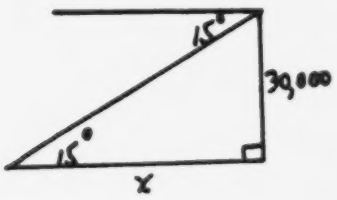
4. Do Applications 1-3.
   Make sure that the students check that their answers are reasonable.

APPLICATIONS:

1. The angle of depression from a plane to an object is 15°. The plane is 30000 feet above the ground. How far to the nearest ten feet is the object from the point directly below the plane?
2. What is the measure of the angle of elevation of the sun when a 6 foot person has a 12 foot shadow?
3. Find to the nearest foot the height of a building if its shadow is 50 feet long when the angle of elevation of the sun is 62°.

SOLUTIONS TO APPLICATION PROBLEMS:

1.



If calculators are used.

$\tan 15 = \frac{30000}{x}$

$(.2679491)x = 30000$

$x = 111961.52$

Answer: 111,960 feet

If not using calculators.

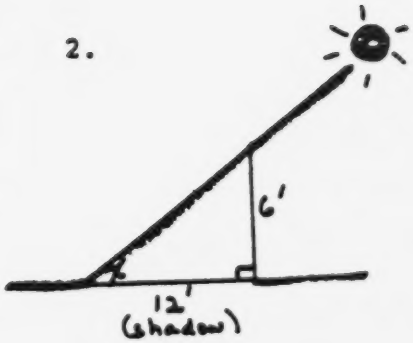
use $\tan 75 = \frac{x}{3000}$

$x = 30000(3.7321)$

$x = 111963$

Answer: 111,960 feet

2.



$\tan x = \frac{6}{12} = .5$

$x = 27°$

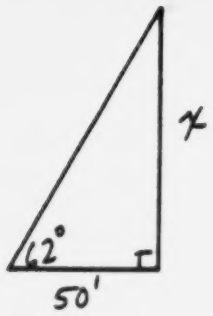
(Show, using yellow chalk, how shadows are created. Also be sure that students understand the meaning of the "angle of elevation of the sun".)

3. $\tan 62 = \frac{x}{50}$

$x = 50(1.8807265)$

$x = 94.036325$

Answer 94 feet



SUMMARY:

Ask, "Suppose we wanted to measure the height of our school building. What measurements could we make directly so that using trigonometry, we can find the height we want?"

THE UNIVERSITY OF THE STATE OF NEW YORK

THE STATE EDUCATION DEPARTMENT

DIVISION OF EDUCATIONAL TESTING

Tables of Natural Trigonometric Functions

(For use with 9th and 10th Year Mathematics Regents Examinations)

Angle	Sine	Cosine	Tangent	Angle	Sine	Cosine	Tangent
1°	.0175	.9998	.0175	46°	.7193	.6947	1.0355
2°	.0349	.9994	.0349	47°	.7314	.6820	1.0724
3°	.0523	.9986	.0524	48°	.7431	.6691	1.1106
4°	.0698	.9976	.0699	49°	.7547	.6561	1.1504
5°	.0872	.9962	.0875	50°	.7660	.6428	1.1918
6°	.1045	.9945	.1051	51°	.7771	.6293	1.2349
7°	.1219	.9925	.1228	52°	.7880	.6157	1.2799
8°	.1392	.9903	.1405	53°	.7986	.6018	1.3270
9°	.1564	.9877	.1584	54°	.8090	.5878	1.3764
10°	.1736	.9848	.1763	55°	.8192	.5736	1.4281
11°	.1908	.9816	.1944	56°	.8290	.5592	1.4826
12°	.2079	.9781	.2126	57°	.8387	.5446	1.5399
13°	.2250	.9744	.2309	58°	.8480	.5299	1.6003
14°	.2419	.9703	.2493	59°	.8572	.5150	1.6643
15°	.2588	.9659	.2679	60°	.8660	.5000	1.7321
16°	.2756	.9613	.2867	61°	.8746	.4848	1.8040
17°	.2924	.9563	.3057	62°	.8829	.4695	1.8807
18°	.3090	.9511	.3249	63°	.8910	.4540	1.9626
19°	.3256	.9455	.3443	64°	.8988	.4384	2.0503
20°	.3420	.9397	.3640	65°	.9063	.4226	2.1445
21°	.3584	.9336	.3839	66°	.9135	.4067	2.2460
22°	.3746	.9272	.4040	67°	.9205	.3907	2.3559
23°	.3907	.9205	.4245	68°	.9272	.3746	2.4751
24°	.4067	.9135	.4452	69°	.9336	.3584	2.6051
25°	.4226	.9063	.4663	70°	.9397	.3420	2.7475
26°	.4384	.8988	.4877	71°	.9455	.3256	2.9042
27°	.4540	.8910	.5095	72°	.9511	.3090	3.0777
28°	.4695	.8829	.5317	73°	.9563	.2924	3.2709
29°	.4848	.8746	.5543	74°	.9613	.2756	3.4874
30°	.5000	.8660	.5774	75°	.9659	.2588	3.7321
31°	.5150	.8572	.6009	76°	.9703	.2419	4.0108
32°	.5299	.8480	.6249	77°	.9744	.2250	4.3315
33°	.5446	.8387	.6494	78°	.9781	.2079	4.7046
34°	.5592	.8290	.6745	79°	.9816	.1908	5.1446
35°	.5736	.8192	.7002	80°	.9848	.1736	5.6713
36°	.5878	.8090	.7265	81°	.9877	.1564	6.3138
37°	.6018	.7986	.7536	82°	.9903	.1392	7.1154
38°	.6157	.7880	.7813	83°	.9925	.1219	8.1443
39°	.6293	.7771	.8098	84°	.9945	.1045	9.5144
40°	.6428	.7660	.8391	85°	.9962	.0872	11.4301
41°	.6561	.7547	.8693	86°	.9976	.0698	14.3007
42°	.6691	.7431	.9004	87°	.9986	.0523	19.0811
43°	.6820	.7314	.9325	88°	.9994	.0349	28.6363
44°	.6947	.7193	.9657	89°	.9998	.0175	57.2900
45°	.7071	.7071	1.0000	90°	1.0000	.0000	

SAMPLE LESSON PLAN

TOPIC — To teach students how to use a mathematics textbook

AIM: — What are some ways to use a mathematics textbook to improve study skills?

PERFORMANCE OBJECTIVES: The Student will be able to:

1. Use a table of contents.
2. Use the index of the textbook.
3. Locate a model test, summaries and model problems for review.
4. Read the mathematics text using "pencil and paper."
5. Increase mathematics vocabulary.
6. Inprove problem solving ability.

Motivation: Ask students "Can your mathematics book provide you with help improving reading and study skills?

Development: The textbook should be in the hands of each student while the discussion takes place.

Elicit the following study aids to be found in their textbooks:

1. The table of contents with its concise, sequential listing of major topics covered.
2. List of mathematical symbols for easy reference.
3. Large-size or boldface headings that announce the content of a section.
4. Italics, boldface or color used to signal "official" terms.
5. Italics, boldface, or color used to call attention to concepts, rules, to principles that should be learned and to flag these for easy reference.
6. Typographical danger signals of pitfalls to avoid.
7. Sections in each chapter for pronouncing and accenting difficult new terms.
8. Chapter summaries that wrap up big ideas.
9. Self-check tests at the close of chapters.
10. The index especially when the student has forgotten the meaning of a word.
11. Look for illustrative examples, analyze a particular one with the class. Have students learn how to follow the step-by-step procedures given by the author next to the illustrative problem.

Ask students if a math textbook is read the same way as any other textbook?

Elicit that it differs in the following ways:

1. It must be read slowly, not once but twice--more often if student has trouble understanding it.

2. It is usually more effective to read a math textbook aloud rather than silently.

3. It is important to "read" the model problem using "pencil and paper".

Ask students when the textbook should be used?

Elicit:

1. To help build one's vocabulary in mathematics.

2. To help solve the problems given for homework by referral to the model problems in the text.

3. To self-check one's skills in solving particular problems.

4. To read work covered during one's absence from class.

5. To review principles and solutions to problems daily so that studying for a test becomes easier.

Explain to the class that in a future lesson that they will learn how to read a math textbook more effectively but that they should become familiar with the book and use the study helps which it provides for them.

SUMMARY

1. How can we use the table of contents?

2. How can we use the index?

3. How can we use a textbook to review for a test?

4. How can we build our mathematics vocabulary?

HOMEWORK: Assign several questions on previously learned topics and ask students to:

1. Locate specific topics using the index.

2. Locate specific topics using the table of contents.

3. List and define a series of "new" mathematics vocabulary words.

SIGNIFICANT ASPECTS OF A MATHEMATICS LESSON

1. "Do Now" (Warm-Up) or (Seatwork)
   a. Should be related to the new lesson, not just an arbitrary exercise i.e. should include pre-requisite skills, definitions, or procedures needed for the new lesson of the day.
   b. Should be written on the board at the beginning of the lesson.
   c. Should serve as a transition between previous learnings and new.
   d. Should take no longer than five minutes to review.
   e. Should be short and attainable by students within the first few minutes of the period.
   f. Can be used to provide writing experience where appropriate by asking students to write definitions, procedures, explanations, etc.
   g. Does not have to be used in a math lesson where the lesson begins immediately.

2. Motivation
   a. Should create a need to know ("in order to solve this problem we must learn this new technique...") or a desire to know ("Why does this card trick work?")
   b. May lead from a problem or apparent paradox
   c. Is short
   d. Yields the aim
   e. Is referred to in the summary

3. Aim
   a. Should be in the form of a question.
   b. Can be easily measured for achievability.
   c. Should be written on the board and left for the entire period.

4. Homework
   a. Should be cyclical (i.e., examples from a month ago, week ago, day ago)
   b. Should be reasonable in length
   c. Should take at most 10-12 minutes to review, preferably less.
      1. Student should "carry" review.
      2. Solutions and questions should be written out on students' work.
      3. Board responsibilities should be assigned in advance.
      4. Can employ visual devices (overhead, colored chalk, etc.) to save time and promote clarity.
   d. Should be numbered.
   e. Should be assigned at the start of the period and written on the same area of the board or be included in a homework assignment sheet.
   f. Should include RCT math or regents review questions.
   g. Should be solved by teachers in their lesson plans.
   h. Should be checked or collected.
   i Can be referred to appropriately in the new lesson.
   j. Provides pre-requisite skills for the new lesson.
   k. May be reviewed at the beginning or the end of the period.
   l. Should include a reading assignment.

5. Development
   a. Concepts should be taught along with techniques i.e., the "why" along with the "how"
   b. One new thought should be developed at a time in the sequence of logical analysis.
   c. The problems used as models should be well chosen and graded in diffculty. i.e., they yield the desired concepts and skills to be studied.
   d. The joy and beauty of the mathematics should be revealed.
   e. Concrete models, diagrams and other visual devices should be employed.

f. The board work should be detailed, neat and written from left to right on the board.
g. Students should share a mutual discovery with the teacher.

6. Questioning
   a. Skillful questioning serves to direct activity:
      - to provoke discussion which will extend knowledge and awareness
      - to stimulate thinking
      - to measure accomplishment by testing information and understanding
      - to seek evidence of reflective thinking and judgments based on proof.
   b. Skillful questioning should keep the student more alert, more critical, more active. Therefore, frame questions of graded difficulty in order to maintain interest, and appeal to the varying abilities of students. Distribute questions, calling on non-volunteers as well as volunteers. Handle the erroneous answers of the weaker students without belittling their attempts. Encourage topical, sustained answers.
   c. To stimulate critical thinking, questions should evoke sustained answers. Therefore, it is poor practice to ask too many questions or to use only factual questions.
   d. After asking a difficult question, it is wise to pause before calling on a student. Such a pause will provide time for thought and discourage the quick, glib answer. The pause also provides time for students who think more slowly to react.
   e. Once a student begins a developed answer, permit him to finish without interrupting him.
   f. Since at all times responses should be directed to the class rather than to the teacher, other class members are free to challenge the accuracy of these responses. (such automatic procedures result, of course, from constant, patient training in the early weeks of the term and from reminders given constantly throughout the term.) Where an individual--teacher--individual recitation is used, general student participation is impossible, and lack of respect for others as well as inattention (day-dreaming, talking, etc.) will result. The teacher has to keep the group in the picture even when dealing with an individual problem.

   g. <u>Criteria for judging questions asked in the classroom</u>

      1. They should be simple and direct in language.
      2. They should be specific in directing attention to the particular problem under consideration.
      3. They should follow a planned order which develops the train of thought in a logical sequence.
      4. They should place the burden of thinking upon the student (and, therefore, should be relatively few in number).
      5. They should be so framed that the answer may <u>not</u> be a simple 'yes' or 'no'.
      6. There should be included in the lesson questions which require students to draw conclusions.
      7. Questions should be adapted to the varying levels of ability in the class.
      8. They should be sufficiently difficult to arouse effort, yet not so difficult as to preclude a response.
      9. There should be a proper balance between fact and thought questions.
      10. Questions should not be repeated. (If you must have one repeated, have a student repeat it).

7. Applications and Drill Problems
   a. Should be graded from simple problems to complex
   b. Should be reviewed on the board by students in the class
   c. Should provide enrichment for talented students
   d. Should be pre-planned (and solved completely in teacher's lesson plan).

8. Summary
   a. Should be elicited from students
   b. Often yields a "recipe" type of problem-solving procedure. Should include key concepts as well.
   c. Can be generated from a "tour" of board work from left to right.
   d. Should refer to the aim.
   e. A medial summary, elicited from the class, should be provided prior to application and/or drill.
   f. A final summary elicited from the class, should be provided after the application problems.

9. Miscellaneous
   a. Teacher should circulate around the room monitoring notebooks and assisting students with individual problems.
   b. Teachers' board work should serve as a model. They should use a ruler, be neat and write out full sentences. Diagrams should be easy to read.
   c. Teachers should have worked out solutions to all homework problems and problems used during the period.
   d. All problems used should not be test oriented.
   e. Timing of a typical lesson:
      5 minutes--"Do Now"
      5-10 minutes--Homework review
      12-20 minutes--Development
      7 minutes--Drill and/or applications.
      2 minutes--Summary

MAXIMIZING INSTRUCTIONAL TIME IN THE CLASSROOM

Listed below are a number of suggestions for making the most of each and every teaching and learning experience.

Before the lesson begins:

1. Plan carefully and fully in advance of each lesson.
2. Have the homework assignment on the board as the class comes into the room.
3. Use homework assignment sheets, if at all possible, to save time.
4. Organize boards in advance to include the lesson topic and a "Do-Now" if appropriate for the lesson. Section the boards in advance if appropriate to the lesson.
5. Arrange for books and materials to be ready for distribution so that time is not wasted, nor is the rhythm of the lesson disrupted once the lesson is under way.
6. Use students as monitors to distribute materials and to write at the board whenever possible.
7. Collect homework after it has been gone over by the class. To go through each and every row can take away valuable instructional time.

Once the lesson is under way:

1. Limit the motivation to 3-4 minutes and elicit the aim within that time frame as well.
2. Take attendance through a seating plan while the class is engaged in reading and writing activities.
3. Limit copying of materials at the board to simple outlines and notes.
4. Limit the time spent on "Do-Now" to no more than 5 minutes.
5. Avoid digressions which are not germane to the lesson or do not serve to enrich or enhance the lesson's purpose or pupils' understanding or appreciation.
6. Do not see individual pupils during the class when their problem is an individual one, inappropriate to class concerns.
7. Use able students to tutor those students who have fallen behind.

THE USE OF THE "DO NOW" IN A MATHEMATICS LESSON

I. Why do we give "do now" problems?

A. To review pre-requisite skills, concepts, vocabulary or procedures that will be needed for the new lesson.
B. To provide opportunities for integrating writing in the mathematics class.
C. To set a routine of students beginning their work as soon as they enter the room. This also sets a tone that the entire period is spent on instruction and not irrelevant activities.
D. To provide the teacher with an opportunity to handle clerical matters and yet not interfere with student learning. This is only one of several opportunities that the teacher has to handle such things as taking attendance without having students unoccupied in a learning activity.

II. What are some of the characteristics of a well chosen "do now?"

A. It reviews pre-requisites skills, concepts, vocabulary or procedures needed in the new lesson.
B. It is within the ability of the class to answer.
C. It can be copied and completed by the class in no more than the first five minutes of the period.
D. It can be used as an opportunity to provide mathematics students with writing experiences.

III. What should we avoid when we use a "do now?"

A. Don't allow it to take too much time.
B. Don't allow it to become a review lesson. Review lessons, like all lessons, must be motivated and developed. The "do now" should NOT become the lesson.
C. Don't include the new topic in the "do now" assuming that the students will know how to do it. If the students can answer questions on the new topic, perhaps, you do not need to teach that lesson.
D. The "do now" is not the motivation, although it may contain part of your motivation.
E. The "do now" is not independent from the rest of the lesson. There should be a transition from the "do now" to what follows. It should be referred to at some point in the lesson. If it is not referred to, perhaps it was not needed.
F. Don't use a "do now" if the lesson does not call for it. A lesson can start immediately without a "do now".
G. Don't be redundant. If your homework assignment has reviewed your pre-requisite skills, you need not do it again in a "do now".

TECHNIQUES OF MOTIVATION

1. Indicate a void in student's knowledge.
2. Show a sequential development.
3. Present a challenge.
4. Indicate the usefullness of a topic.
5. Use recreational mathematics.
6. Tell a pertinent story.
7. Get students actively involved in justifying mathematical curiosities.
8. Use teacher-made or commercially prepared materials.

Posamentier, Alfred & Stepelman, Jay, Teaching Secondary School Mathematics (Charles Merrill Publishing Company, 1981).

Suggest an appropriate motivation for each of the following lessons.

1. What is Sales Tax?

2. What are the expenses of operating and maintaining an automobile?

3. How do we solve verbal problem using perimeters?

4. How do we apply our knowledge of statistics to help us be better consumers?

5. How can the hourly rate for salaried employees be computed?

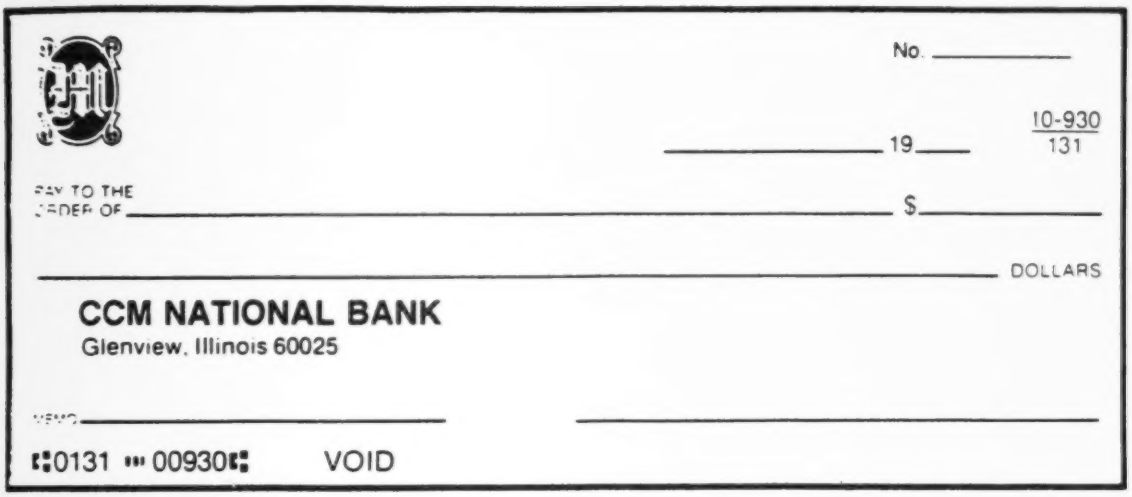
THE OVERHEAD PROJECTOR

ADVANTAGES:

1. Simplicity of Operation.
2. No change in classroom lighting.
3. A horizontal writing surface.
4. Position of the teacher.
5. Advance preparation of materials.
6. Utilization of dynamic effects.
7. Saving of time during the period.

SOME SUGGESTIONS FOR USE OF THE OVERHEAD PROJECTOR:

1. Can be used by students when they are assigned the explanation of homework problems. This saves the time that would ordinarily be taken by having students write solutions to homework on the chalkboard. Also the projected solutions are more easily viewed than those placed on the chalkboard.
2. Can be used by the teacher by writing the "do-now" questions on an acetate in advance of the class. In this way the teacher can devote time to students in the room as they begin immediately to work on the "do-now".
3. Can be used by the teacher with graphing by having a prepared grid available for immediate use.
4. Movement of geometric models may be done using overlays of transparencies.
5. Can be used by the teacher by writing any verbal problems on transparencies and thus save time from writing them on the board.
6. Can be used by the teacher in copying a model problem from a text and discussing how to use the model problem with the class. This saves having students bring their texts to class.



No. _____

10-930
131

_____ 19____

PAY TO THE ORDER OF _____ $_____

_____ DOLLARS

CCM NATIONAL BANK
Glenview, Illinois 60025

MEMO _____

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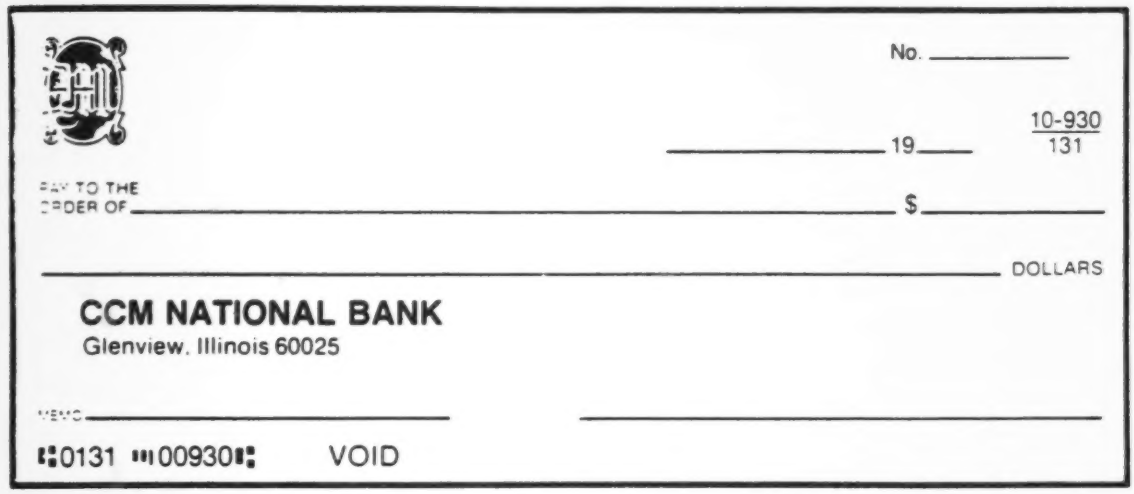

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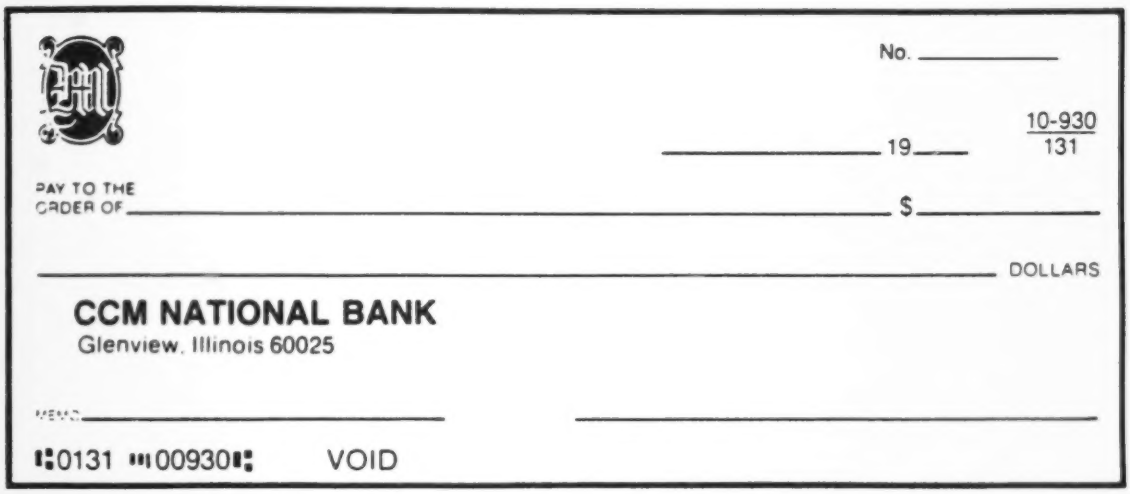

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PAY TO THE ORDER OF _____ $_____

_____ DOLLARS

CCM NATIONAL BANK
Glenview, Illinois 60025

MEMO _____

⑆0131 ⑈00930⑆ VOID

Consumer and Career Mathematics Consumer Forms and Problems Masters © Scott, Foresman and Company

Check Register name _____

RECORD ALL CHARGES OR CREDITS THAT AFFECT YOUR ACCOUNT

NUMBER	DATE	DESCRIPTION OF TRANSACTION	PAYMENT/DEBIT (-)	✓ T	FEE (IF ANY) (-)	DEPOSIT/CREDIT (+)	BALANCE
			$		$	$	$

REMEMBER TO RECORD AUTOMATIC PAYMENTS/DEPOSITS ON DATE AUTHORIZED

BALANCE YOUR CHECK BOOK

by doing these things
Fill in Below Amounts from Your BANK STATEMENT and CHECK BOOK

Balance Shown on BANK STATEMENT ..... $ _____

Add Deposits Not on Statement..... $ _____

_____

_____

Sub-Total..... $ _____

Subtract Checks Issued But Not on Statement

$ _____

_____

_____

_____

_____

_____

_____

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_____

_____

Total ..... $ _____

BALANCE..... $ _____

Balance Shown in Your CHECK BOOK ..... $ _____

Add Any Deposits Not Already Entered in Check Book..... $ _____

_____

_____

_____

Sub-Total..... $ _____

Subtract Service Charges And Other Bank Charges Not in Check Book

$ _____

$ _____

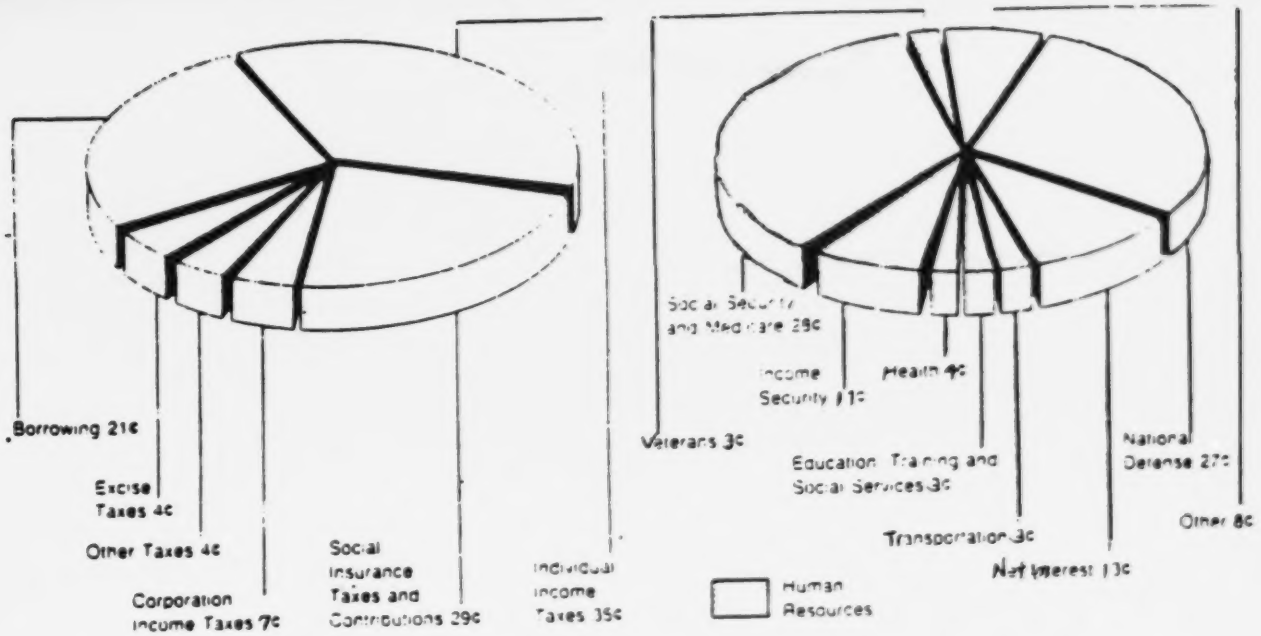
_____

_____

Total ..... $ _____

BALANCE ..... $ _____

Consumer and Career Mathematics Consumer Forms and Problems Masters © Scott, Foresman and Company



3. Using a copy of "The Government Dollar" 1984 ask:
   a) Where does most of the Government's money come from?
   b) Where does most of it go?
   c) What is meant by Human Resources?
   d) How much more is received by the Government from individual income taxes than from corporation income taxes?

SAVINGS BANK
SBLI
LIFE INSURANCE

AGE 45

RATES NEAREST BIRTHDAY

LOW COST
45-46
PROTECTION

Dividends payable, as earned, on all policies beginning the first year. Liberal cash and loan values, except Term policies. Premiums are also payable semi-annually and quarterly. For other rates, plans, waiver of premium and policy benefits, ask at our Life Insurance Department.

PREMIUM RATES

KIND OF POLICY	$5,000		$10,000		$20,000		$30,000	
	Annual	Monthly*	Annual	Monthly*	Annual	Monthly	Annual	Monthly
Straight Life	$138.30	$ 12.45	$271.60	$ 24.40	$538.20	$ 48.40	$807.30	$ 72.60
Life Paid Up at Age 65	178.55	16.05	352.10	31.70	699.20	63.00	1,048.80	94.50
Endowment at Age 65	224.70	20.20	444.40	40.00	883.80	79.60	1,325.70	119.40
20 Payment Life	178.55	16.05	352.10	31.70	699.20	63.00	1,048.80	94.50
20 Year Endowment	224.70	20.20	444.40	40.00	883.80	79.60	1,325.70	119.40
5 Year Renewable Term	41.00	3.70	77.00	6.90	149.00	13.40	223.50	20.10
20 Yr. Decreasing Term	43.40	3.90	81.80	7.40	158.60	14.20	237.90	21.30
25 Yr. Decreasing Term	52.05	4.70	99.10	8.90	193.20	17.40	289.80	26.10
30 Yr. Decreasing Term	62.15	5.60	119.30	10.70	233.60	21.00	350.40	31.50

*Minimum premium payment $3.00. For quarterly premium, estimate 26% of annual premium

a) Using the table above, what is the cost of one monthly premium for a $5000 straight life insurance policy?

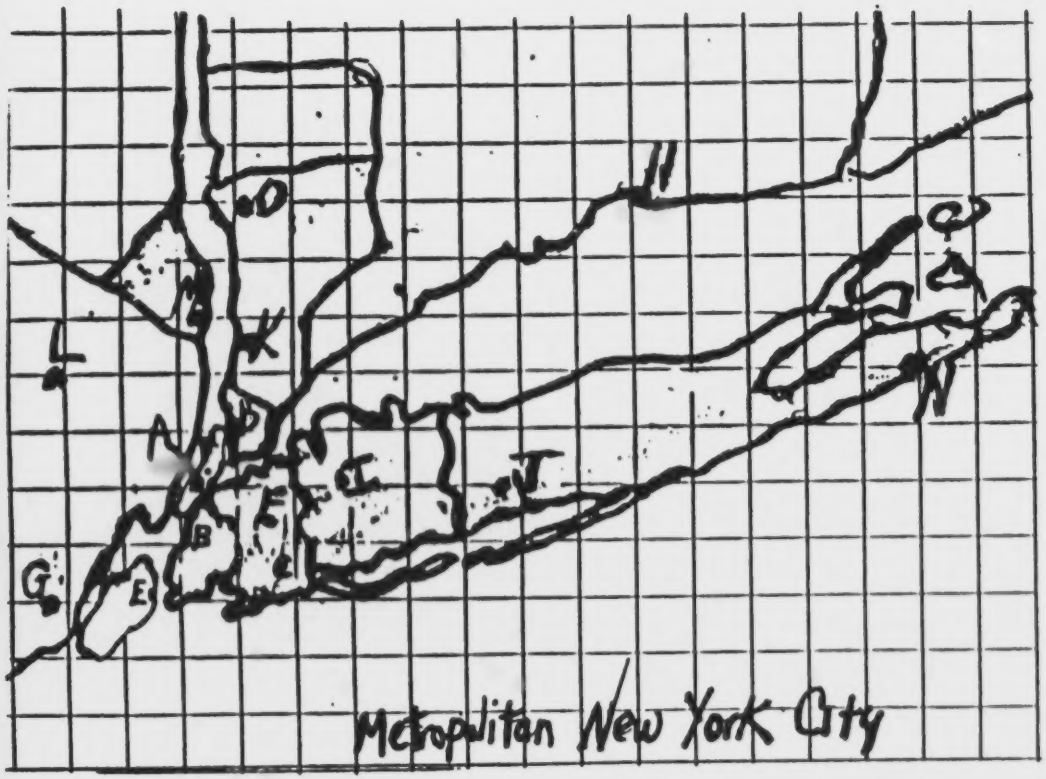
b) What is the total cost of 12 monthly premiums for a $10,000 20-payment life insurance policy?

c) How much do you save if you pay an annual premium on the policy in part b?

d) What would be the quarterly premium of a $30,000 20 year endowment policy?

e) How much more would you pay in part d than if you had paid the annual premium?

1. Distribute the above map of the Metropolitan New York Area. Ask the class to approximate the following distances:
   1) Midtown Manhattan to New City
   2) Downtown Brooklyn to Flushing
   3) Paterson, N.J. to East Hampton
   4) Riverdale to Peekskill
   5) Peekskill to New Haven
2. Elicit that this is impossible since further information is needed. Ask, "What else would be useful to know in order to answer these questions?" Elicit that it would be helpful to know how many miles the side of each square of the grid represents.



A - Midtown Manhattan
B - Downtown Brooklyn
C - Jamaica, Queens
D - Riverdale (Bronx)
E - St. George (Staten Island)
F - Flushing (Queens)
G - Elizabeth, New Jersey
H - New Haven, Connecticut
I - Mineola (Nassau County)
J - Babylon (Suffolk County)
K - Dobbs Ferry (Westchester)
L - Paterson, New Jersey
M - New City (Rockland County)
N - East Hampton, Long Island
O - Peekskill (Westchester)

55

HOMEWORK ASSIGNMENT FOR PARTICIPANTS

1. Being a newspaper to class that contains examples of the following:
   - purchasing an automobile
   - graphs, tables and charts
   - stocks and bonds
   - sales

2. What prerequisite skills are needed in the following lessons:
   Volume I?
   1. page 119 Aim: Shopping at Sales
   2. page 143 Aim: Computing Compount Interest
   3. page 181 AIM: Computing Expenses Associated with Automobile Leasing
   4. page 274 Aim: Using Scale Drawings

CLASSROOM MANAGEMENT

FOR

CONSUMER MATHEMATICS

INCORPORATING READING AND WRITING SKILLS INSTRUCTION IN MATHEMATICS LESSONS

STATEMENT OF PHILOSOPHY:

The fundamental goal of mathematics instruction is to teach mathematical skills and concepts so that students can understand and apply the mathematical processes they will encounter in college and career settings. Reading and writing skills are intimately connected to the development of competence in all areas generally and in mathematics in particular. The understanding of mathematical processes is enhanced through skill in reading and writing. Conversely, reading and writing themselves can be strengthened through the study of mathematics. It is, therefore, the professional responsibility of teachers of mathematics to include reading and writing in mathematics instruction for the mutual enhancement of both of these critically important areas.

STUDENT OUTCOMES DESIRED:

In order to incorporate reading and writing into mathematics instruction, teachers must be familiar with the skills of reading and writing as they relate to mathematics. As a result of an emphasis on reading and writing in mathematics, students should become able to do the following:

1. Read mathematical material with understanding.
2. Distinguish between technical and general definition of words used in mathematics.
3. Interpret mathematical symbols.
4. Translate English phrases into mathematical symbols.
5. Translate mathematical symbols into English phrases.
6. Write coherent proofs of mathematical theorems.
7. Write summaries of the development of mathematical concepts.
8. Read and follow directions.
9. Analyze and interpret pictorial and graphic representations.
10. Relate previous material to what is presently being read.
11. Construct mathematical models based on word problems.
12. Write conclusions based on statistical data.
13. Take coherent notes based on classroom presentations.
14. Analyze errors.

GUIDELINES FOR DEVELOPING READING AND WRITING ACTIVITIES:

The following are some specific methods for incorporating reading and writing into mathematics instruction. These methods should be used on a regular basis where natural and appropriate in the mathematics lesson.

I. Classwork: The student should...

a) write out rules, definitions, principles in the notebook
b) answer verbal problems in sentence form
c) write the aim of the lesson in the notebook
d) write out a plan for solving a problem
e) write out the steps involved in doing a geometric construction
f) formalize statements by writing them in "if-then" sentences
g) summarize the lesson in two or three sentences
h) translate mathematical phrases and sentences

II. Homework: The student should...

a) do some reading in addition to solving problems
b) write out questions to be asked in class the following day
c) write out the question completely and not just its solution
d) write definitions of technical terms
e) solve verbal problems and express answers in sentence form
f) write the reasons that justify their solutions
g) explain in writing the possible errors that could be made in solving a problem
h) analyze the errors made in a problem that was solved incorrectly
i) explain the reasoning involved in solving a problem
j) write conclusions based on a graph
k) translate mathematical phrases and sentences
l) write out the steps involved in doing a geometric construction

III. Tests: The student should...

a) solve verbal and/or non-routine problems
b) write out the procedures involved in completing a mathematical process
c) write out the analysis of an error when the test is returned
d) write conclusions based on a graph
e) write out complete proofs with grammatically correct statements and reasons (if appropriate)
f) write out definitions of technical terms
g) write a sentence explaining why a particular answer is reasonable or unreasonable
i) write answers to verbal problems in complete sentences

ADDITIONAL SUGGESTIONS:

1. Since there is a high correlation between speaking in complete, grammatically correct sentences and writing effectively, teachers should be expected to:
   ---Ask questions that yield full sentences as answers. Questions should begin with words such as why, explain, how, describe, compare, etc.

2. Instruct students on how to present solutions to problems in a clear, logical fashion. Form should be stressed along with content.

3. When writing notes on the board, write them in full sentences. Do not fall into the bad habit of writing just phrases and fragments as part of your board notes. Step to the rear of the room at the end of the period and look at your boards to see if what is written is cohesive, grammatically correct and legible.

4. Teach students how to take notes. Periodically check students' notebooks to see if they are writing in them and have them organized in a suitable fashion.

5. Use the summary portion of the lesson to have students write. This will give them a chance to practice their writing skills and will help them when reviewing their notes.

6. Encourage the students to bring dictionaries to class and to use them. The students who most quickly wean themselves from their home language to the English language are those that frequently use the dictionary in class.

7. Highlight good writing by using model student work and displaying it on the bulletin boards. Reproduce good writing for students to examine and learn from.

8. Build vocabulary lists and glossaries of terms.

9. Have students read aloud their written work so that they may develop an "ear" for writing.

10. Inform the students of the importance of writing as a skill and how it will be useful to them in the work place.

SUGGESTIONS FOR STUDENTS TO DEVELOP THEIR MATHEMATICS VOCABULARY

1. Be on the watch for new words. They usually are in italics when they first occur and are defined.

2. Whenever you come to a new word, think all around it—think what it means, how it is spelled, what other words you can associate with it.

3. If the meaning of a word you thought you knew escapes you, try the index, or consult a mathematics dictionary.

4. Make a conscious effort to use your mathematics vocabulary regularly and intelligently.

5. The symbols in mathematics are, in a sense, part of your mathematics vocabulary. When a new symbol appears, give it the same attention you would give to a new word.

6. As a double check on yourself, keep a page in your notebook where you list each new word or symbol as you come to it (just the word, not the definition). Periodically take a look at this list and see if you can state the definition of each word.

7. Display a chart or listing of essential mathematics vocabulary within the classroom.

8. Write each new word on an index card and write its definition on the back of the card. At least twice a week, shuffle the deck of index cards and deal yourself the number of definitions you can state in one hour.

Ideas for Lessons Using a Newspaper

Mathematics

- Use sports charts to find which team won the most games? Which team lost the most games? How many games were played altogether?

- Use weather maps and charts to determine the average temperature of a locale.

- Use supermarket ads to provide problem solving experiences. e.g.,
  If you want to buy all the dairy items on sale, how much would it cost?

- Use supermarket ads to price rounding of numbers. e.g., $1.95 to the nearest dollar is $2.00.

- Use TV listings to reinforce addition of fractions. e.g.,
  Cheers, ½ hour; Hill Street Blues, 1 hour; Channel 4 News, 1½ hours
  If you watched all these shows, how much time would you spend watching TV?

- Use food ads to reinforce rounding numbers and estimating totals. e.g.,
  $ 2.99 is about $ 3.00
  $ 5.75 is about $ 6.00
  The total is about $ 9.00.

- Use the weather map and/or temperature chart to compute how much warmer it is in one city than in another or how much colder it is in one city than another.

- Discuss percentages as shown in ads featuring discounts. Write percentages as decimals. e.g.,
  20% = .20
  How much will a $ 100.00 item cost if it is reduced by 20%?

ON HOMEWORK

HYPOTHESIS: Homework which reaches optimum significance needs to be carefully planned to harmonize with instructional goals. It should accent quality more than quantity. It should prevent wasted or uneconomical effort by students. It should be cyclical in nature to assure retention of previously learned material.

CHARACTERISTICS OF A POOR ASSIGNMENT:

1. The assignment consists of an arbitrary designation of pages or exercises in the text, chosen hurriedly and with little thought.

2. Prerequisite knowledge and skills have not been identified. There is no reason to believe the students can handle the material.

3. The assignment is fragmentary and bears little relation to what has gone before or what is to come after.

4. Although drill is not the goal, there is repetition to the point of frustration or boredom. No challenging exercises are present.

5. The assignment has not been planned for utilization in subsequent lessons; it doesn't set the stage for new ideas.

PLANNING VERSUS MAKING A HOMEWORK ASSIGNMENT:

Teachers should make a conscious effort in their planning:

a. to investigate future topics
b. to reinforce previous topics
c. to provide experiences that promotes discrimination among concepts in order to make the mathematics more available for the solution of the problems arising outside the mathematics classroom.

STEPS TO CONSIDER IN PREPARING CYCLICAL HOMEWORK ASSIGNMENTS:

1. The teacher should first list the topics that are to be taught each day (for the days between full-period tests).

2. The homework assignments are then planned <u>vertically</u> in the following manner: <u>ONLY TOPICS ARE LISTED FIRST</u>.
   a. the topic on the day's lesson is included for at least 3 successive days and then including it every other night or every third night, etc.
   b. The other topics chosen are from previous lessons alternating when they are given. Continuous computational topics should be included in most classes.

   c. After the topics have been listed for each assignment, the teacher should consider the length of the assignment and whether enough topics are covered for the needed variety on the test following these set of assignments. If adjustments are necessary, additional review from previous work can be included. Also movement of topics (because of too many long questions in one assignment versus not any long question, etc.) may be done at this point. Teachers are reminded that homework must be long enough to cover review but short enough to have students explain their solutions when it is gone over and yet allowing time for the teaching of a new developmental lesson each day.

d. After this planning, the books can now be used to select the problems. If this is done in a vertical fashion considering one topic and selecting problems for all of the assignments on this topic, gradation and variety on successive nights is made easier.

Each assignment should include at least 1 question that is verbal in nature.

Each assignment should contain in both single concept questions as well as multiple concept questions.

The new material should be lightly stressed in the homework. Giving 1 problem on the new topic is more successful than giving many. In this way, greater stress can be placed upon asking students to verbalize the rules, methods, or procedures needed to solve such a problem. If a student cannot do this problem, giving more than one problem will cause further frustration and math anxiety. If a student makes an error, he would reinforce this error many times if more than one problem is given. Giving one problem also provides a quick way of determining whether the new material was learned. Variations of the topic are given in successive nights.

e. Each assignment includes pages to be read on the topic taught that particular day.

f. Teachers should realize that if there is any uncertainty of completing a topic on a particular day, it is better not to include this topic on that night's assignment.

ADDITIONAL COMMENTS WITH REFERENCE TO HOMEWORK:

1. If homework assignments are planned from test to test,

   a. teachers will not only know whether they have enough topics for a varied and comprehensive test but will also know if they have both long and short topics for the given test.

   b. teachers can include review of topics previously tested that in their judgment need further review spirally in future homeworks and then include these topics on the next test. This should help the student who was unsuccessful on a given topic when it was first tested become confident when they are successful on the next test.

   c. students become more familiar with a comprehensive test and not as thrown when they take a state exam or a city-wide exam.

   d. the teacher can make up the test at the same time that they have prepared the set of homeworks between tests. It this way the test can be written, duplicated, proofread and a key prepared well ahead of it being given. Teachers are then directed as to what schedule of teaching should occur and in some way prevents going off on a tangent in class.

2. The overhead projector is very helpful in going over the homework. Students may purchase china markers at the beginning of the term. The teacher then gives an acetate when assigning problems to each student to bring in the following day. The student then comes to the machine, explains his/her work, chairing any questions asked from the class. This furthers verbalization by students and provides more sustained explanations. Teachers need to stress that students give explanations of what was one or thought of to go from step to step rather than have them read the work. No time is spent putting up the problems

on the board. All work becomes visable to the entire class. More student interaction takes place since this student is chairing questions from the class. Students may borrow the acetate and bring in the next day. If a disruption during a period (fire drill, etc.) the homework may be gone over the following day. Time may be spent on training students to pay attention to the discussion on hand not to copying of the work. More emphasis can be placed on re-doing work done incorrectly rather than mere copying of the solution. Going over the homework after the applications of the new lesson and before the summary of the lesson usually speeds up the going over of the homework rather than extending if to the entire period or most of the period.

3. Teachers are asked to prepare all solutions to each assignment in advance of their need with the students. In this way the teacher can determine the types of errors that could occur and know what to stress in the teaching of the topic. Time is saved since the teacher can quickly determine the point of error and ask questions accordingly.

4. Teachers may prepare homework sheets for distribution to the class. The benefits of having such a sheet are as follows:

   a. for students:
      (1) if absent, they have the homework and reading assignment and can come in prepared
      (2) provides information as to what topics to study for a test
      (3) gives enough advanced notice of test date to allow for planned study periods
      (4) if they know of another commitment for a particular night, they can do their homework in advance

   b. for teachers:
      (1) eliminates need for writing assignment on the board at the beginning of each class period
      (2) eliminates nightly pressure
      (3) eliminates having to first review which problems were already given
      (4) allows for gradation of problems
      (5) allows for a better planned test
      (6) provides material to be given to new admits and those students who return after extended absence.

   c. for parents:
      (1) gets better image of school, department and teacher since they see more planning
      (2) appreciates that child can do work if absent
      (3) appreciates not having last minute notice of test

Sample model of information on homework sheet:

#23 Given: Due:

Name of Text	104	201	204	212	277	313	Page #
Read 236-8,249, 250,305,306	46	15	48	13	19	16	Problem #

Answers to problems:

Note:

Putting answers on sheet helps student learn how to use answers when doing solutions and reduces math anxiety.

THE FOLLOWING MAY BE DISCUSSED WITH STUDENTS AND GIVEN TO THEM IN PRINTED FORM FOR REFERRAL AT HOME WHEN DOING THEIR MATHEMATICS HOMEWORK:

HOW TO DO YOUR MATHEMATICS HOMEWORK

PURPOSES OF HOMEWORK:

a. To help reinforce what you learned in class.
b. To help identify those parts of the lesson you do not understand.
c. To increase the number of correctly solved problems to which you can refer when reviewing for a test.

1. Read the introductory section of the assignment to identify and understand the principle it teaches.

   a. Make certain you understand the meaning of every word in the section.
   b. Visualize every step along the way.

2. Do the sample exercises.
   This will determine how well you understand the principles being taught and whether you will be able to work problems based on those principles.

   a. Read each step carefully in the model problems.
   b. Understand every term used.
   c. Follow the reasoning behind each manipulation.
   d. Solve the problem all over again on your own.

   It is a good idea to reserve a section of your loose-leaf notebook for working through the sample problems in the book.
   Writing out the steps is far better than merely reading through what the author has written.
   This section in your notebook will be a handy review for you before tests.

3. Recite the principles you have learned. If you cannot repeat the principles used, go back to the reading material prior to the exercises and read it through again.
   Write the principles and procedures used to solve each type of problem on an index card from which you can study for a test as well as quickly review previous work each day.
   Make review a part of your daily calendar. It will eliminate last minute cramming and further retention of your mathematical skills.

What to do if you "get stuck" on a problem!

a. Look back at the book, at your notes, and at the sample model problems.

What to do when an answer is wrong in your homework.

a. Analyze the problem to find out at what point the error was made.
b. Listen to the analysis done in class.
c. Take down the correct answer.
d. At home, re-do the problems you got wrong before trying the new assignment.

HOMEWORK

Questions to consider:

a. How long?

b. Should it be cyclical?

c. Should it be graded in difficulty?

d. Should it be adapted for the level of the class?

e. When should it be prepared?

f. How is it given to the student?

g. What if there no text/poor texts?

h. Is it reviewed in class?

i. Are all problems reviewed?

j. How much time is spent in class reviewing the homework?

k. Who writes the problems on the board?

l. Who corrects the wrong solution?

m. Is it collected?

n. Is it returned?

o. What part of the grade does homework reflect?

p. Is parent notified of missing homework?

q. What about students who never do the homework?

SAMPLE CONSUMER

ATE	TOPIC OF LESSON	CURRENT TOPICS (Managing Money Unit)				
	How do we budget family income? (M.M. - 1)	Budgeting income				
	Determining net worth (M.M. - 2)		Net worth			
	Reading labels (M.M. - 3)	Budgeting income		Reading labels		
	Comparison shopping (M.M. - 4)		Net worth	Reading labels	Comparison shopping	
	Sales Tax (M.M. - 5)	Budgeting			Comparison shopping	Sales Tax
	Shopping from a catalog (M.M. - 6)		Net worth		Sales Tax	Catalog shipping
	Shopping at sales (M.M. - 7)			Reading labels	Catalog shopping	Sales shopping
	Installment buying (M.M. - 8)		Study for Test			
	Test					

MATHEMATICS HOMEWORKS

REVIEW TOPICS (Last 2 units - Earning a Living, Calculators)

Cost of commuting (E.L. - 1)			Classified ads (E.L.)	Sales Tax (Calc)	Income Tax (Calc)	+ Mult Decimals
	# of hours worked (E.L.)			Consumer Price Index (E.L.)	Income Tax (Calc)	+ % → dec
		Annual Monthly & Semi-monthly Salary (E.L.)		Flowcharts (Calc)		+ % of a #
Cost of commuting (E.L.)			Weekly & biweekly salary (E.L.)		Order of operation (Calc)	
	# of hours worked (E.L.)			Hourly rates (E.L.)		+ % of a #
		Types of salaries (E.L.)			% increase (E.L.)	+ Mult Decimals
Cost of commuting (E.L.)					% increase (E.L.)	Tips (E.L.)

TESTING

1. **PLANNING OF TESTS:**

   a. Tests should be planned ahead. A worthwhile suggestion is to plan the next test as soon as the previous one is given after planning the homework assignments from one test to another.
   b. The teacher should begin by listing the topics to be tested as a result of the homework planning and classwork experiences.
   c. The teacher should consider the objectives of each question.

2. **SOURCE OF QUESTIONS:**

   a. Same type as homework.
   b. Same type as done in class.
   c. Use of other teacher-made tests from the past.
   d. Use of test booklets prepared by publishers.
   e. Use of previous state exams or school uniform exams.
   f. Use of texts.

3. **LENGTH OF TEST:**

   a. The teacher should take the test first, then multiply the time by about $5\frac{1}{2}$.

      Correct test length if necessary keeping in mind that time is needed for distribution and collection. The time factor by which one multiplies may vary depending upon the type of class that is being tested, the amount of reading involved with each question, etc.

4. **TYPE OF QUESTIONS:**

   a. short questions that are single-concept questions, multi-concept questions, verbally stated questions, etc.
   b. multiple choice questions
   c. long questions

5. **FORMAT OF TESTS:**

   a. The test should start off with easy questions, go to difficult and then to the more difficult questions i.e., ascending order of difficulty.
   b. Topics covered on last two days before the test should not be included on the test since students need to practice these topics through homework.
   c. Standards from State Education Department should be used in both the wording and the selection of test questions.
   d. Students should be informed as the point value on the test and the directions to be followed so that they may budget their time accordingly.

5. FORMAT OF TESTS CONTINUED:

e. Space should be allowed on tests for students to show work in an organized fashion.
f. Homework should be planned cyclically so that a frequent review of topics covered on the test may be done through the homework.
g. Tests should include "extra for experts" question(s) in which no actual points are given for correct work but an indication such as a "+" next to the grade. This "+" may be considered when determining a student's grade for the marking period or course.
g. Tests should be neat and not crowded. It is suggested that a draft of the actual test be written first, then changes made if necessary.
h. Duplication of the test should be done prior to the day of need so that the test may be taken by the teacher, proofread ahead of time so that students are not spending unnecessary time on a problem in which an error occurs, and a marking key may be made up as the proofreading is done.

6. MARKING OF TESTS:

a. Standards of marking as used in marking state exams should be used for marking of teacher-made tests.
b. A marking key should be used so that uniformity of grading takes place.
c. In marking a question where partial credit is to be given, the teacher should decide before marking how many credits are to be given to each step in the solution. If a problem contains several parts of which some are dependent on others, the teacher should not penalize the student several times but should give him credit if his work for one part is consistent with his work on the other part. i.e., if a student "follows through correctly", deduction is made only for the initial error made.
d. It is also suggested that if there are any long questions, the teacher should mark the same question on each paper first and then mark the second long question, etc. In this way the marking will be consistent on all student papers.
e. If an answer is wrong, put an x through the answer so that it cannot be changed without being noticed.
f. Besides putting the grade on the test, whenever possible try to write a comment that would encourage better performance or give credit to the students' work.
g. If comments concerning organization of students' work is warranted, include them either with the individual question or with the grade at the top of the test.
h. Try to have the tests marked by the day after it is given so that the greatest gains can occur in learning from mistakes which are "fresh in students minds". Do not go over a test unless the students have their papers in front on them.
i. As you mark the papers, keep a list of those students who you would want to write their solutions on the board when the test is gone over. (It is suggested that you have an alternate student in case of absence). One student may be chosen to do two or possibly three questions at the board depending upon the length of the questions.

j. An analysis of test results should be done so that you are aware of the type of errors that have been made so that emphasis can be made on the particulars in your future teaching.
k. It is NOT necessary to inform the students of the number of students failing, etc. (This type of discussion should be avoided with the students since it usually causes more problems than being helpful to the improvement of instruction).

7. **USE OF TEST RESULTS:**

a. An item analysis should be made. There should be a definite follow-up in which notes are made on the difficulty of each question.
b. The length of the test should be analyzed.
c. Comments should be made for future references.
d. An analysis of test results should be made for evaluation of success of various work taught. This analysis should make the teacher aware of what points to stress when the test is gone over.
e. Successive homework assignments should then include questions that caused more difficulty to students. This should be done through a spiral review of topics. These items may then be retested on the next test.
e. Students organization of work should be analyzed so that specific strategies can be given to students to improve their organization.
f. Common errors made by students should be determined to make changes in future teaching of these topics.

8. **RETURNING OF TESTS:**

a. Tests should be returned the very next day after it is given if possible. In this way it is fresh in the student's mind as to what he/she did on the test. It also shows the students that the teacher is concerned about the improvement of learning in a sequential subject.
b. Test papers should be arranged in order by rows to facilitate the distribution of the papers. The teacher, as he/she is marking the papers, should make a list of those students who should put up the work considering their work shown and not just the correct answer. If several approaches to the same problem appear, each method should be put up at the board. If no students get a particular question correct, the teacher should elicit the necessary steps in the solution by asking questions directed toward that goal.
c. A "Do Now" on the day of going over the test might be any of the following:
    a. Having students explain, in writing, definitions, rules or procedures for topics from the test.
    b. Having students explain, in writing, a comparison between the procedures needed for different topics from the test.
    c. Review of the pre-requisite skills needed for the next lesson.

The "Do Now" should not be similar problems to those causing difficulty on the test since if they couldn't do the problems and did not have another explanation of the solutions, they would not be able to do the "Do Now" exercises.

d. A discussion should take place with the students (prior to any distribution of test papers) on the purposes of going over a test. e.g. looking for one's point of error looking for alternative methods

Students must feel that they have something to gain from this experience and that understanding what they got wrong has value for the future especially in our sequential subject matter.

Sttudents must be informed as to the need for taking notes on problems whether they were right or wrong.

e. The board should be marked with the problem numbers and the students' names of those responsible for putting up the complete solution. Emphasis must be placed on the need for work shown that would be helpful to those students having difficulty with each problem. This assignment of students should have been done at the time of marking the papers.

f. Before distributing the papers, students should be told that if their name appears on the board that they are writing the work for the benefits of their classmates.

g. As students are writing on the board, the teacher should be walking around discussing individual papers with students, making suggestions to them, encouraging them individually, and checking that students are looking at the boardwork and taking notes.

h. Students are then to go to the board and explain (not just read) their work to their classmates. If questions arise, they should should be directed to the entire class for responses.

i. Strategies can be discussed with students on budgeting of time on a time, preventing careless errors, organizing work, techniques of studying for a math test, etc.

j. Students should be allowed to keep their test papers and stress should be placed on studying from them for future exams.

SAMPLE TEST CONSUMER MATH - TERM I

UNIT: MANAGING MONEY - Lessons 1 thru 8

NAME _____ MATH CLASS _____

PART I: ANSWER ALL QUESTIONS. SHOW ALL WORK AND WRITE YOUR ANSWERS IN THE SPACE PROVIDED AT THE RIGHT. (5 CREDITS EACH)

1. What is 35% of 80? 1. _____

2. Multiply 28.70 x .07 2. _____

3. Change 2½% to a decimal 3. _____

4. Add: 73.85 + 21.4 4. _____

5. How many pounds are there in 48 ounces? 5. _____

6. What is the unit price of cooking oil which costs $2.59 for 32 ounces? 6. _____

7. What is the discount amount if a $21 item is marked 10% off? 7. _____

8. What is the selling price of a $20 item marked 15% off? 8. _____

9. What is the sales tax charged on a $24 item if the sales tax rate is 8%? 9. _____

10. What is the <u>total cost</u> of an item marked $12.50 if the sales tax is 6½%? 10. _____

11. A radio sells for $12 down and $3.50 per month for 18 months. How much do you actually pay for the radio? 11. _____

12. Which is a better buy - a six pack of soda that costs $2.89 or the eight pack which costs $3.36? 12. _____

13. You purchase a computer but still have to finance $250. Using the table below, determine the monthly payment needed to finance $250 at 12% for 2 years? 13. _____

Monthly Payments per $1 Financed

Number of Monthly Payments

APR.	12	18	24
10%	.0879	.0605	.0464
12%	.0893	.0612	.0471
15%	.0903	.0624	.0485
18%	.0917	.0638	.04996

14. Match the words listed in column A with the letter next to the phrase in column B that best defines each item in column A. **(1 CREDIT EACH)**

A	B	
a. down payment	A. amount of money that is charged for interest for delaying payment	14. a _____
b. list price	B. amount of loan paid in advance	b _____
c. finance charge	C. amount of money you pay at the time of purchase	c _____
d. installment	D. amount of the regular selling price	d _____
e. discount	E. percent of loan paid in advance	e _____
	F. monthly payment for a loan	
	G. amount of money that is the difference between regular selling price and its sale price.	

PART II: ANSWER ALL QUESTIONS. SHOW ALL WORK AND LABEL YOUR ANSWERS.

(10) CREDITS EACH)

15. Determine the monthly expenses of the Smith family if they spend $425 on rent, $352 on food, $150 on gas and electricity, $112 for insurance and a monthly payment of $64 for a loan.

    If the Smith family's monthly income is $1250, how much money can they save each month.

16. The Adams family owns the following items: A car worth $8,000, jewelry valued at $6,350, furs worth $3,200 and C.D.'s worth $10,000. What are the family's net assets?

17. Page 35 of the October 1986 catalog lists the following:

    Item #456-1, blue shirts, Item #456-3, red shirts, selling for $9.75 each. Include sales tax of 8% and a shipping charge of $.75 per item.

    Complete the order form below to purchase two blue shirts and one red one.

CATALOG DATE: _____ **PAGE:** _____

Item No.	Quantity	Description	Size	Color	Price for 1	Total Cost

Send to: _____ **Total** _____

_____ **Tax** _____

_____ **Shipping** _____

Total Enclosed _____

CONSUMER MATHEMATICS

CORRELATING THE HOMEWORK PLAN WITH THE SAMPLE TEACHER-MADE TEST

SKILL OR TOPIC	NUMBER OF TEACHING OR REVIEWING OPPORTUNITIES	TEST ITEM NO.	POINT VALUE

CHECKLIST FOR EVALUATING A MATHEMATICS TEST

		Yes	NO
1.	Are there directions for taking the test?	___	___
2.	Are the directions simple and clear?	___	___
3.	Is the test legible?	___	___
4.	Is the test of appropriate difficulty?	___	___
5.	Is the test of appropriate length?	___	___
6.	Is space provided for showing work?	___	___
7.	Are answer spaces provided?	___	___
8.	Are point values indicated?	___	___
9.	Is duplication avoided? Is each concept tested only once?	___	___
10.	Do short questions test only one mathematical concept?	___	___
11.	Is there provision for writing extended responses?	___	___
12.	Is there provision for original problem solving as well as algorithmic exercises?	___	___
13.	Is there provision for extra credit for students who finish early?	___	___
14.	Is there a variety of types of problems on the test?	___	___
15.	Is there provision for reinforcing previously learned skills?	___	___
16.	Does the test include review items based on previous homework and class exercises?	___	___

TESTS

Questions to consider:

a. When should tests be given?

b. How much notice should students be given?

c. What is to be tested?

d. What types of questions should be given?

e. How long should a test be given?

f. How difficult should the test be?

g. What strategies should be given to the student to study for the test?

h. What should be looked at while making a test?

i. How do you use the test results?

j. Should a test be reviewed in class after it is marked? When? How?

k. How does future homework relate to test results?

SUGGESTIONS FOR STUDENTS RELATED TO MATHEMATICS EXAMS

To the teacher: What additional suggestions would you give to students?

1. Start reviewing far enough in advance so you have time to do a careful, unhurried job.

2. Review by RE-DOING model problems, homework problems, class problems, problems from previous tests, and quizzes.

3. When you take a test, go in with an attitude that will help you. Have confidence in your own ability, but don't be over-confident. Don't try to "get by" with doing as little as possible. Don't worry to the point of anxiety. Fear alone can make a person do poorly on a test regardless of his ability and knowledge.

4. Follow directions. Read carefully. Consider the point value.

5. Look over the whole test quickly at the start and do the ones you are sure of first.

6. If you are unable to answer a question, leave it and go on to others, coming back to the hard ones later.

7. Be careful to show clearly what you are doing. Put in enough steps so that your method is perfectly clear.

8. Work neatly. It fosters accuracy.

9. Be organized in your solutions. It helps reduce the errors that could occur.

10. Check back for accuracy as you go along.

11. If you have extra time at the end of the test, re-check your work.

CLASSROOM SITUATIONS - CONSUMER MATHEMATICS

Situation 1

What do you do if...?

A pupil arrives late to the computer room and does not sit in his or her assigned station. This pupil then proceeds to talk to his or her neighbor as the lesson is progressing. You give directions and write the program on the board and you see that this same pupil fails to follow your directions. He constantly interrupts the lesson and refuses to take notes or use the computer.

Situation 2

What do you do if...?

A pupil claims he can't see the writing on the board, doesn't answer your questions during the course of the lesson and forgets to bring a workbook to class. He does no homework but passes tests. He claims he has had this work before. He has complained the computer screen hurts his eyes and is content to have other pupils work at his station in the computer room.

TOPICS ON RCT

1) Addition of whole numbers
2) United States currency
3) Subtraction of whole numbers
4) Multiplication of whole numbers
5) Division of whole numbers
6) Numbers written in word form
7) Rounding (whole numbers)
8) Place Value
9) Motion (R x T = D)
10) Down payments/Installment Buying
11) Mean, median, mode
12) Approximation
13) Greatest common factor and disivibility
14) Reducing fractions
15) Improper fractions ---- mixed numbers
16) Meaning of fractions
17) Fractions ---- decimals
18 Multiplication of fractions; wages; recipes
19) Division of fractions
20) Least common denominator
21) Addition of fractions
22) Subtraction of fractions
23) The ruler
24) Ratio
25) Scale drawing
26) Proportion and equivalent fractions
27) Probability
28) Decimals ---- percents
29) Rounding decimals
30) Addition of decimals
31) Subtraction of decimals; making change; deductions
32) Checking and savings accounts
33) Multiplication of decimals
34) Division of decimals
35) Meaning of percent
36) Decimals, fractions ---- percents
37) Finding a percent
38) Finding a percentage of a number
39) Taxes
40) Tips
41) Discounts and sales price
42) Interest
43) % increase
44) Commission
45) Bar graphs
46) Circle graphs
47) Line graphs
48) Pictographs
49) Angles, protractor, parallel and perpendicular lines
50) Sum of the angles of a triangle
51) Perimeters: rectangles, parallelograms, squares, triangles
52) Areas: rectangles, squares
53) Parts of a circle
54) Circumference of a circle
55) Area of a circle
56) Prime numbers
57) Solid figures
58) Volume
59) Meaning of signed numbers
60) Number line graphs
61) The thermometer
62) Addition of signed numbers
63) Multiplication of signed numbers
64) Division of signed numbers
65) Simple algebraic equations
66) Evaluation
67) Exponents
68) Square root
69) Pythagorean theorem
70) Plotting points on Cartesian plane
71) Standard measurement
72) Telling time
73) Metric system
74) Charts and tables
75) Miscellaneous rates

HOMEWORK ASSIGNMENT FOR TEACHER PARTICIPANTS

You are teaching the unit "Earning a Living" in Consumer Mathematics. Pick a specific lesson and:

1. Prepare a list of activities or assignments you would give to a "more capable" student in your class.

2. Prepare an assignment you would give a "less capable" student in your class to reinforce basic skills.

3. Prepare an assignment, activities or materials you would give to a student who has been excessively absent and wants to make up work missed.

COMPUTER APPLICATIONS IN

CONSUMER MATHEMATICS

SAMPLE VISICALC SPREADSHEET

CELL LOCATION OF THE CURSOR DATA OR FORMULA

COMMAND LINE/VALUE/LABEL

EDIT/ENTRY LINE

	A	B	C	D	E	F	G	H	I	J	K	L	...BK
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
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254													

CONSUMER MATHEMATICS

LEISURE

LESSON: 1L

AIM: How can we use the spreadsheet to calculate the cost of a new automobile?

PERFORMANCE OBJECTIVES: The student will be able to...

1. Read and interpret the handout they will receive that lists automobile prices.
2. Develop skill entering values and labels by creating a "sticker" for the window of their new car.
3. Use the sum function to determine the total sticker price.
4. Determine the way the spreadsheet calculates by changing the options they wish to purchase using:
   a) The delete command.
   b) The move command.
5. Print and save the worksheet.
6. Clear the screen so that a new "sticker" price may be calculated.

VOCABULARY: sticker price, accessory, automatic recalculation

MOTIVATION:

Distribute the handout on car prices. Pose problem: My budget provides for my purchasing a new car this year. I can only spend $8000, exclusive of sales tax. Is there a car listed on this chart that I can afford?

STUDENT HANDOUT:

1985 CAR PRICE CHART

	CHEVY CAMARO	DODGE DAYTONA	FORD MUSTANG	HONDA PRELUDE	MAZDA RX7	MERCURY CAPRI	NISSAN 200SX	PLYMOUTH CONQUEST	PONTIAC FIERO	RENAULT FUEGO	TOYOTA CELICA	VOLKS. SCIROCCO
BASE PRICE	8530	8505	6885	10345	10945	7944	8999	12564	8495	9295	8449	9980
DESTINATIN CHARGE	414	414	374	179	220	374	200	190	320	395	195	320
AUTOMATIC TRANS.	425	439	439	350	380	439	500	540	425	INCLUDED	460	450
AIR-CONDITIONING	750	737	743	625	650	743	675	793	750	625	690	650
COURTESY LIGHTS	38	30	28	40	50	35	38	125	35	40	32	45
AM/FM RADIO	175	155	138	325	350	225	250	400	235	275	230	290
STEREO CASSETTE	600	570	550	790	800	625	650	975	600	972	770	670
FULL SPARE TIRE	75	75	75	75	75	75	75	75	75	75	75	75
CRUISE CONTROL	175	180	190	185	180	180	190	185	175	190	175	175
REAR-DEFROSTER	135	135	135	150	155	155	160	165	150	160	150	165
TINTED GLASS	95	95	95	100	100	95	100	115	95	100	100	100
POWER STEERING	210	200	190	250	250	220	230	280	200	250	200	260
POWER WINDOWS	200	185	185	225	230	220	230	270	250	260	210	220
RUSTPROOFING	80	75	80	80	80	75	80	80	80	75	80	80
* TOTAL *	11902	11795	10107	13719	14465	11405	12377	16757	11885	12712	11816	13480

DEVELOPMENT:

1. Lead students to understand that when purchasing a car the buyer must consider the base price and the destination charge. Everything else is an option that may or may not be purchased at the discretion of the buyer. The Ford Mustang cost $7259 with no options and $7397 with a radio. In fact if I purchase the Mustang I can choose the following accessories: Automatic Transmission, Courtesy lights, AM/FM radio, and a Rear-Defroster and still keep the price below $8000. What is the price with the options I mentioned? ($7999)

- How much is the Renault Fuego with everything except tinted glass? ($12612) Everything except the stereo cassette? Lead students to express that subtracting $972 cannot be answered as quickly as when subtracting $100. Ask the class if they can suggest a way that the spreadsheet can be used for these calculations. Lead discussion to establish the following:
  a) The built in SUM function can be used to make calculations easier.
  b) Formulas can be written to add specific rows and columns.
  c) The Storage Command enables us to save several different options.
  d) The delete command can quickly eliminate accessories that we do not want.
  e) The automatic recalculation ability of the spreadsheet enables the user to see the price change instantaneously when options are deleted.
  f) The Move Command can temporarily eliminate options still under consideration that we may choose to bring back at a future time.
  g) The Print Command will give us a hard copy of the "sticker price".

2. Have students enter the data on one car into the spreadsheet. The class should work together to create the first sticker price. Select the Mazda RX7. Enter the name of each option, the car name, the repeating

labels, the cost of each option and the total. When all the data has been entered save the worksheet named Mazda.

- Appleworks: Open Apple-S
- VisiCalc: (/SS, Mazda, Return)
  Do not clear the sheet. Try to bring the price down to $12,500. Eliminate the air-conditioning. Position the cursor in the row with the air-conditioning. Use the delete option to eliminate the row.
- Appleworks: (Open Apple-D, Return, Return)
- VisiCalc: (/DR)
  Direct student attention to the total price. Elicit that it did not change. Remind students the way the total price was entered. Explain that it was entered as a value, students simply typed in the number. Elicit that if this was entered as an indicated sum then the spreadsheet would find the original total and then recalculate automatically every time we decided not to purchase a given accessory. Move the cursor to the totals row and place it in the cell where the present total (14465) now appears. Enter@SUM(B4.B16). We are making the assumption that the three top columns contain the car name and the separating line. There were originally fourteen items and we deleted one leaving thirteen. Check to see that everything mentioned is in agreement before you press return. Ask students if they think the total will change when they press return. It should change to 13815 as we eliminated the air-conditioning.

3. Continue using the delete command to eliminate the stereo cassette, the power steering and the power windows. This has brought the price down to $12,535. Agree that this is satisfactory and plan to print the sticker to place in the window. If students make mistakes and eliminate incorrect items or erase columns instead of rows then reload the file and begin again.

- Appleworks: Press escape to return to the main menu. Press Return to add files. Press Return to see a menu of the data disk and then move the arrows to select the Mazda file, press Return to load the file. Answer "yes"

to "Do you really want to do this?"

- VisiCalc: (/SL, Mazda, Return)

4. Before the sheet is printed pose the following challenge. I just received a $500 tax refund and I will add this to the money I have budgeted for my new car. What accessories can I put back. Elicit that the air-conditioning and the stereo are still out of reach but the power items can now be included. Tell class you really didn't need the power items, what you really want is the air-conditioning. One way would be to eliminate the rear defroster and put back the air-conditioning. Direct the discussion to determine that deleting options from the sheet is only one way to eliminate them from the sum. If we move them out of the way, below the present total, we can put them back if we change our mind. Have class agree that instead of retyping the data we deleted they will reload the sheet and start from the beginning.

5. Clear the present worksheet.

- Appleworks: Position the cursor in A1 and access the Blank command (Open Apple-B), choose the column option and highlight the two columns that were used. As soon as you press return the sheet will be cleared.
- VisiCalc: (/CY)

Reload the MAZDA file and adjust the total by making it a SUM and not just a value. This time there should be fourteen entries and we would use @SUM(B4.B17), Return.
** EXTREME CARE MUST BE TAKEN THAT ROWS USED AS ENDPOINTS IN OUR FORMULA ARE NOT MOVED. THIS WILL CAUSE ERRORS. TELL STUDENTS NOT TO ELIMINATE THE RUSTPROOFING. The situation caused by moving endpoints of a formula will be explained in detail in the next lesson. **
Remind students that when using the Move Command to move data down we choose the row just below our desired location. When moving data up, our desired location is the row we choose. Following the pattern suggested in the previous example, eliminate the air-conditioning first. Position the cursor in the row that contains the air-conditioning. Plan to move this row to row twenty-five. Access the move command with:

- Appleworks: (Open Apple-M, Return, Return, Return, ↓ (until B26 is reached), Return)
- VisiCalc: (/M, B26, Return)

Point out the new position for the air, in row 25. Point out the new Total. Let students tell you that the spreadsheet recalculates all data when a move is called for. Continue in the same manner moving the other three items below the position of the air. You will notice that it continually moves up after items above it are eliminated. When the sum reaches 12535, remind the class that now we want to put back the air-conditioning. Do this by positioning the cursor in the row that now contains the air conditioning. Put it back anywhere above the sum using the exact number of the row you have chosen. This time move the cruise control out of the way and decide that this will keep you closest to your budget. If time permits allow students to experiment and see if they can come even closer.

6. Print the "sticker". Decide to use incremental printing mode as our worksheet is small and we will not exceed the paper's width. You will have to consult the printer manual to see what special characters are needed to produce this print. Let us assume that we find that Control-N is the set of special characters that we need. Proceed in the following manner.

- Appleworks: Enter Open Apple-O to choose printer options. SC is the two letter code that you will need to select the special code that you wish to send to the printer. Enter SC, then type Control-N^. Remember to type the caret and not the return key. As soon as the caret is typed you will be returned to the printer option menu. Notice the "yes" that appears next to the option "send characters to printer". The Escape key will return you to the spreadsheet. It might be wise to delete all the unwanted options at this point that lie below the total, then the entire worksheet can be printed by choosing the "all" option. Open Apple-P will access the print command. Press return four times and the "sticker price" will be printed in incremental mode.

- VisiCalc: Enter /PP to access the print option of the print command. Enter " to indicate setup. Whatever you type now will appear on the edit entry line. The code for Control-N is ^CN, the ^C is VisiCalc's code for the control part. If you would like a title such as "Mr. X's Mazda", type it at this time. Remember to end with a carriage return (^R) or two to skip a line (^R^R). The title will print as soon as you press return. Now choose the lower right cell to be printed by entering the coordinates or pointing to the cell with the cursor. Press return and the sheet will print. Make sure that the lower right cell is above the unwanted options. (Just a reminder, Control-N will not work for all printers, check your manual.)

7. Sums may be found by skipping over listed items. For example SUM(B4.B9,B12.B13,B17) will eliminate the items in rows 10, 11, 14, 15, and 16. The new total can be placed below the original. Once the desired SUM has been reached the items can be deleted for the purpose of printing.

APPLICATIONS:

1. Students should be encouraged to select the car of their choice and print their own sticker prices. The best way to handle this is to let student's work independently and have the teacher available to answer questions and solve problems.

2. If the class cannot work independently some suggested stickers follow:

MARK'S NEW CAR

TOYOTA
CELICA

BASE PRICE	8449
DESTINATIN CHARGE	195
AM/FM RADIO	230
FULL SPARE TIRE	75
REAR-DEFROSTER	150
RUSTPROOFING	80
* TOTAL *	9179

BARRY'S NEW CAR

CHEVY
CAMARO

BASE PRICE	8530
DESTINATIN CHARGE	414
AUTOMATIC TRANS.	425
AIR-CONDITIONING	750
COURTESY LIGHTS	38
AM/FM RADIO	175
CRUISE CONTROL	175
REAR-DEFROSTER	135
TINTED GLASS	95
POWER STEERING	210
RUSTPROOFING	80
* TOTAL *	11027

3. Students could be encouraged to print two "stickers" in an effort to aid them in making decisions.

JANIE'S NEW CAR

PLYMOUTH
CONQUEST

BASE PRICE	12564
DESTINATIN CHARGE	190
AUTOMATIC TRANS.	540
AM/FM RADIO	400
FULL SPARE TIRE	75
REAR-DEFROSTER	165
TINTED GLASS	115
POWER STEERING	280
RUSTPROOFING	80
* TOTAL *	14409

JANIE'S NEW CAR

PLYMOUTH
CONQUEST

BASE PRICE	12564
DESTINATIN CHARGE	190
AUTOMATIC TRANS.	540
AIR-CONDITIONING	793
COURTESY LIGHTS	125
AM/FM RADIO	400
STEREO CASSETTE	975
FULL SPARE TIRE	75
CRUISE CONTROL	185
REAR-DEFROSTER	165
TINTED GLASS	115
POWER STEERING	280
POWER WINDOWS	270
RUSTPROOFING	80
* TOTAL *	16757

SUMMARY:

1. Why is it not wise to enter the total sticker price as a value?
2. What is the best way to enter this total?
3. Why is it better to move the option, rather than delete it?
4. Why is it necessary to Save the original sheet with all the options?
5. Is the built in SUM function the only way that totals can be found?
6. What keystroke accesses the built in functions?
7. If I want to move data from row 6 to row 26, what must my destination row be?
8. If I wish to move data from row 26 to row 6, what must my destination row be?
9. How can I retrieve a row that I have erased with the delete option? (You can only retrieve it if you have previously saved the file that contained the row with the Storage Command. Reload the complete file from the disk.)
10. Can I use the sum function to total nonadjacent rows? (Yes, use commas to skip over unwanted rows.)

HOMEWORK:

1. Calculate the sticker price of a Dodge Daytona with every option except rear defroster, tinted glass, power windows and rustproofing.
2. What is more expensive, the Dodge Daytona with all options except the air conditioning or the Toyota Celica with everything except air conditioning and automatic transmission?
3. Assume the Base price is in row 4 and the Rustproofing in row 17. All other options lie between as indicated on our price chart. Write an expression, using the built in

SUM function to calculate the total sticker price without rows 6, 13, 15 and 16.

4. Describe how you would use the spreadsheet to calculate the price of each car including only the base price, the destination charge, the rear defroster, and the AM/FM radio.
5. Find the new totals described in Question 4.
6. If purchasing a car with all the options, which one is the most expensive? The least expensive?
7. How many cars can be purchased with all the accessories offered for under $10,000?
8. How many cars with limited options (example 4) can be purchased for under $10,000? Name them.

HOMEWORK SOLUTIONS:

1. $11,305
2. The Daytona at $11,058 as opposed to the Celica at $10,666.
3. @SUM(B4.B5,B7.B12,B14,B17)
4. Move the Radio and Defroster rows to row 6 and row 7 respectively. Insert a column in row 8. Position the cursor in B8. Enter SUM(B4.B7), Return, replicate across the row from B8 to M8.
5. See next page.
6. Plymouth Conquest, Ford Mustang.
7. None.
8. Seven: Camero, Daytona, Mustang, Capri, Nissan, Pontiac and Celica.

5.

	CHEVY CAMARO	DODGE DAYTONA	FORD MUSTANG	HONDA PRELUDE	MAZDA RX7	MERCURY CAPRI	NISSAN 200SX	PLYMOUTH CONQUEST	PONTIAC FIERO	RENAULT FUEGO	TOYOTA CELICA	VOLKS. SCIROCCO
BASE PRICE	8530	8505	6885	10345	10945	7944	8999	12564	8495	9295	8449	9980
DESTINATIN CHARGE	414	414	374	179	220	374	200	190	320	395	195	320
AM/FM RADIO	175	155	138	325	350	225	250	400	235	275	230	290
REAR-DEFROSTER	135	135	135	150	155	155	160	165	150	160	150	165
* TOTAL *	9254	9209	7532	10999	11670	8698	9609	13319	9200	10125	9024	10755

DIRECTORY OF IBM DISK

SPREADSHEET TITLE	CURRICULUM MANUAL PAGE REFERENCE
CALC 2L1	Page 175 Section 9
CALC 11L1	Page 193 Sports Place End Of Summer Sale
CALC 11L2	Page 197 Example 2
EARN 6L1	Page 201 Total Earning Based On $6.50 Hr
EARN 6L2	Page 203/4 Section 4
EARN 10L1	Page 208 Development 1
EARN 10L2	Page 209/210 Sections 2, 3, 4
EARN 12L1	Page 219 Sellmore ... Salary Schedule
EARN 12L2	Page 224 Newboss ... Schedule
EARN 17L1	Page 228
EARN 17L2	Page 232 Netsal
INTRO 1L1	Page 14 Mygrades
INTRO 2L1	Page 21 Section 3
INTRO 3L1	Page 113 Development
INTRO 4L1	Page 46 Our Grades
INTRO 4L2	Page 50 Sec 6 Multiplication Table
INTRO 5L1	Page 69 Applications 1
INTRO 5L2	Page 69 Suggestions For Lab Session
ITRIG 8L1	Page 390 Section 3
ITRIG 8L2	Page 392 Section H
ITRIG 8L3	Page 393 Application 1 Top Of Page
LEISURE 1L1	Page 277
LEISURE 15L1	Page 288 Computer Price Chart
LEISURE 15L2	Page 290 Computer Store Sale
LEISURE 17L1	Page 299 Mets Statistics
LEISURE 17L2	Page 301 American League
LEISURE 17L3	Page 304 Mets Pitchers
LEISURE 18L1	Page 311 College
LEISURE 18L2	Page 314 Income/Assets
LEISURE 18L3	Page 317 Section 6
MMON 5L11	Page 241 Section 5
MMON 5L13	Page 243 Section 4
MMON 5L21	Page 256-257 NYC Tax Chart
MMON 14L1	Page 262 7% Simple Interest

MMON 14L2	Page 263 Section 3
MMON 16L1	Page 269 7% Compound Interest
MMON 16L2	Page 273
MATH 3L1	Page 322 Calories
MATH 3L2	Page 326,7 Section 6
MATH 12L1	Page 335 Circles
MATH 12L2	Page 337 Rectangular Solids
MATH 19L1	Page 349,350 Tempconv
MATH 19L2	Page 351 Celsius
TCAG 3L1	Page 354 Halley's Comet June
TCAG 3L2	Page 358 Consumer Math Grades
TCAG 3L3	Page 361 Halley's Comet May
TCAG 10L0	Page 377 Motivation Pg 378,9 Section 2
TCAG 10L1	Page 380 Natural Satellites
TCAG 10L2	Page 382 Earnmore
TCAG 10L3	Page 384 Robots
TCAG 10L4	Page 383 Subjects ... Seniors
TCAG 4L1	Page 368

DIRECTORY OF APPLEWORKS DATA DISKS

The following chart summarizes the electronic spreadsheets thay may be found on the enclosed data disks. This listing will facilitate the selection of the appropriate spreadsheet for use with Consumer Mathematics - Volume II (Computer Applications).

SPREADSHEET TITLE	CURRICULUM MANUAL PAGE REFERENCE
CALC 02L.1	Page 175 Section 9
CALC 11L.1	Page 193 Sports Palace End Of Summer Sale
CALC 11L.2	Page 197 Example 2
EARN LIVE 06L.1	Page 201 Total Earning Based On $6.50 Hr
EARN LIVE 06L.2	Page 203/4 Section 4
EARN LIVE 10L.1	Page 208 Development 1
EARN LIVE 10L.2	Page 209/210 Sections 2, 3, 4
EARN LIVE 12L.1	Page 219 Sellmore ... Salary Schedule
EARN LIVE 12L.2	Page 224 Newboss ... Schedule
EARN LIVE 17L.1	Page 228
EARN LIVE 17L.2	Page 232 Netsal
IND MEAS 08L.1	Page 390 Section 3
IND MEAS 08L.2	Page 393 Section 2
IND MEAS 08L.3	Page 393,4 Section 3
INTRO 1L.1	Page 14 Mygrades
INTRO 2L.1	Page 21 Section 3
INTRO 3L.1	Page 30 Development
INTRO 4L.1	Page 46 Section 2
INTRO 4L.2	Page 50 Section 6
INTRO 5L.1	Page 69 Applications 1
LEISURE 01L.1	Page 277
LEISURE 15L.1	Page 288 Computer Price Chart
LEISURE 15L.2	Page 290 Computer Store Sale
LEISURE 17L.1	Page 299 Mets Statistics
LEISURE 17L.2	Page 301 American League
LEISURE 17L.3	Page 304 Mets Pitchers
LEISURE 18L.1	Page 311 College
LEISURE 18L.2	Page 314 Income/Assets
LEISURE 18L.3	Page 317 Section 6

MAN MONY 05L1.1	Page 241 Section 5
MAN MONY 05L1.2	Page 242 Section 6
MAN MONY 05L1.3	Page 243 Section 4
MAN MONY 05L2.1	Page 256 NYC Tax Chart
MAN MONY 05L2.2	Page 256-257 NYC Tax Chart
MAN MONY 14L.1	Page 262 7% Simple Interest
MAN MONY 14L.2	Page 263 Section 3
MAN MONY 16L.1	Page 269 7% Compound Interest
MAN MONY 16L.2	Page 273
MATH HOME 03L.1	Page 322 Calories
MATH HOME 03L.2	Page 326,7 Section 6
MATH HOME 12L.1	Page 335 Circles
MATH HOME 12L.2	Page 337 Rectangular Solids
MATH HOME 19L.1	Page 349,50 Tempconv
MATH HOME 19L.2	Page 351 Celsius
TABLES 03L.1	Page 354 Halley's Comet June
TABLES 03L.2	Page 358 Consumer Math Grades
TABLES 03L.3	Page 361 Halley's Comet May
TABLES 04L.1	Page 358
TABLES 10L.1	Page 380 Natural Satellites
TABLES 10L.2	Page 382 Earnmore
TABLES 10L.3	Page 384 Robots
TABLES 10L.4	Page 383 Subjects ... Seniors